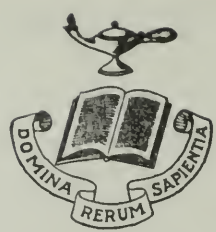




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THE TRANSACTIONS  
OF THE  
MEDICO-CHIRURGICAL SOCIETY  
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VOL. XVI.—NEW SERIES

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*SESSION 1896-97*

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EDINBURGH: WILLIAM F. CLAY

*PUBLISHER TO THE SOCIETY*

1897



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## PREFACE

THE present Volume is the *Sixteenth* of the *New Series*, and contains a record of the work done during the past Session.

That work, as hitherto, embraces the communication of Original Papers; the exhibition of Patients, illustrating rare and interesting forms of disease; and the exhibition of Pathological and other Specimens, so essential to the proper understanding of the morbid changes which take place in the human body.

During the past Session a Special Meeting was held to hear a description of the plans of the new City Hospital for Infectious Diseases, about to be erected at Colinton Mains, and to witness a limelight demonstration of the plans by Robert Morham, Esq., City Architect.

During the past Session Extra Meetings were held for the exhibition of Patients, Pathological Specimens, Instruments, etc. It is hoped that such Meetings will materially increase the usefulness of the Society.

It is believed that the publication of the Transactions in this permanent form will prove a valuable contribution to medical literature, will encourage the Members to take a more active part in the work of the Society, and will tend in no small degree to increase the influence and usefulness of the Medico-Chirurgical Society of Edinburgh.

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*Editor.*

October 1897.



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	and Ed., . . .	1886
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	William Smith, L.R.C.P. & S. Ed., L.F.P. & S. Glasg., . . . . .	1890
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	William Crawford M'Ewan, M.D., C.M., <i>Frestonpans</i> , . . . . .	1892
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	John Orr, M.D., F.R.C.P. Ed., . . . . .	1895
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	James Stewart Fowler, M.B., C.M., . . . . .	1895
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200	John Tod, M.B., C.M., <i>Leith</i> , . . . . .	1895

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	Robert Wilberforce Inkster, M.D., C.M., . . . . .	1895
	William Leslie Mackenzie, M.D., C.M., . . . . .	1895
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	William Alfred Johnstone Alexander, M.B., C.M., . . . . .	1896
	William Tasker Lundie, M.D., C.M., . . . . .	1896
	John Cormack Smith, M.B., C.M., . . . . .	1896
	Harry Rainy, M.B., M.R.C.P. Ed., . . . . .	1896
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	Archibald Adam Scot Skirving, M.B., F.R.C.S. Ed. M.R.C.S. Eng., . . . . .	1897
215	Theodore Shennan, M.D., C.M., . . . . .	1897
	John Macmillan, D.Sc., M.B., F.R.C.P. Ed., . . . . .	1897

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260	Professor David James Hamilton, M.B., F.R.C.S. Ed., <i>Aber-</i> <i>deen University</i> , . . . . .	1876
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	Richard Freeland, M.D., C.M., <i>Broxburn</i> , . . . . .	1879
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	John Haddon, M.D., C.M., <i>Hawick</i> , . . . . .	1883
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	D. G. Braidwood, M.B., C.M., <i>Halkirk, Caithness</i> , . . . . .	1889
	Professor J. Berry Haycraft, M.D., D.Sc., <i>Cardiff</i> , . . . . .	1889
	Professor A. W. Hughes, M.B., F.R.C.S. Ed., M.R.C.S. Eng., <i>London</i> , . . . . .	1889
335	Albert E. Morison, M.B., F.R.C.S. Ed., M.R.C.S. Eng., <i>Hartlepool</i> , . . . . .	1889
	William H. Barrett, M.B., C.M., <i>Southport</i> , . . . . .	1890
	James Hunter, M.D., C.M., <i>Linlithgow</i> , . . . . .	1890
	George M. Robertson, M.B., F.R.C.P. Ed., <i>Murthly</i> , . . . . .	1890
	Charles Templeman, M.D., C.M., <i>Dundee</i> , . . . . .	1891
340	John Macpherson, M.D., F.R.C.P. Ed., <i>Larbert</i> , . . . . .	1891
	J. J. Douglas, M.D., F.R.C.P. Ed., <i>London</i> , . . . . .	1891
	Robert Stirling, M.B., C.M., <i>Perth</i> , . . . . .	1891
	Simon C. Fowler, M.B., C.M., <i>Juniper Green</i> , . . . . .	1892
	Robert Dundas Helm, M.D., C.M., <i>Carlisle</i> , . . . . .	1892
345	William Gordon Woodrow Sanders, M.B., F.R.C.P. Ed., <i>Caen</i> , . . . . .	1892
	Ernest Coleman Moore, M.B., C.M., . . . . .	1892
	W. Ramsay Smith, M.B., C.M., <i>South Australia</i> , . . . . .	1892
	T. Herbert Littlejohn, M.B., F.R.C.S. Ed., <i>Scarborough</i> , . . . . .	1892
	Alexander Peyer, M.D., <i>Zurich</i> , . . . . .	1893
350	Alexander Reid Urquhart, M.D., F.R.C.P. Ed., <i>Perth</i> , . . . . .	1893
	F. W. Foxcroft, M.B., C.M., <i>Wilmslow</i> , . . . . .	1893
	William B. Mackay, M.D., M.R.C.S. Eng., <i>Berwick-on-Tweed</i> , . . . . .	1893
	Alex. Mitchell Stalker, M.D., C.M., <i>Dundee</i> , . . . . .	1893
	D. W. Johnston, F.R.C.S. Ed., <i>Johannesburg, S. Africa</i> , . . . . .	1893
355	William Brendon T. Gubbin, M.D., C.M., <i>Bardolph, Hertford</i> , . . . . .	1893
	Frank Ashby Elkins, M.D., C.M., <i>Sunderland</i> , . . . . .	1893
	Philip Grierson Borrowman, M.B., C.M., <i>Elic</i> , . . . . .	1893
	William Craig, M.B., C.M., <i>Cowdenbeath</i> , . . . . .	1894
	James Mackenzie, M.D., C.M., <i>Burnley</i> , . . . . .	1894
360	Charles E. Douglas, M.D., C.M., <i>Cupar-Fife</i> , . . . . .	1894
	Thomas Easton, M.D., C.M., <i>Stranraer</i> , . . . . .	1894
	William Simmers, M.B., C.M., <i>Crail</i> , . . . . .	1894

		Date of Admission.
	Frederick Maurice Graham, F. R. C. S. Ed., L. R. C. P. & S. Ed., <i>India,</i>	1894
	Gopal Govind Vatve, M.D., <i>Bombay,</i>	1895
365	John Hosack Fraser, M.B., M.R.C.P. Ed., <i>Bridge of Allan,</i>	1895
	John Struthers, M.B., C.M., <i>South Africa,</i>	1895
	George Thomas Beatson, M.D., C.M., <i>Glasgow,</i>	1895
	Andrew Balfour, M.B., C.M.,	1895
	Robert Durward Clarkson, M.B., C.M., <i>Falkirk,</i>	1896
370	George Kerr Grimmer, M.B., C.M., <i>South Queensferry,</i>	1897
	John Frank Crombie, M.B., C.M., <i>North Berwick,</i>	1897

## ORDINARY MEMBERS.

ARRANGED ALPHABETICALLY.

**(a.) Members who pay the Annual Subscription of  
Ten Shillings.**

	Dr R. Abernethy, 10 St Colme Street,	1892
	Dr J. O. Affleck, 38 Heriot Row,	1871
	Dr R. S. Aitchison, 74 Great King Street,	1887
	Dr W. A. J. Alexander, 1 George Place, Pilrig,	1896
5	Dr John Anderson, Pitlochry,	1896
	Dr James Andrew, 2 Atholl Crescent,	1869
	Professor Annandale, 34 Charlotte Square,	1863
	Dr E. F. Armour, 149 Bruntsfield Place,	1890
	Dr G. W. Balfour, 17 Walker Street,	1874
10	Dr J. W. Ballantyne, 24 Melville Street,	1885
	Dr A. H. Freeland Barbour, 4 Charlotte Square,	1881
	Joseph Bell, Esq., 2 Melville Crescent,	1862
	Dr G. A. Berry, 31 Drumsheugh Gardens,	1883
	Dr R. J. A. Berry, 4 Howard Place,	1893
15	Dr Alexander Black, 13 Howe Street,	1883
	Dr W. T. Black, 2 George Square,	1877
	Dr Robert H. Blaikie, 42 Minto Street,	1883
	Dr Bleloch, 2 Lonsdale Terrace,	1871
	Dr G. P. Boddie, 147 Bruntsfield Place,	1888
20	William Booth, Esq., 1 Minto Street,	1888
	Dr F. D. Boyd, 6 Atholl Place,	1891
	Dr Byrom Bramwell, 23 Drumsheugh Gardens,	1876
	Dr N. T. Brewis, 23 Rutland Street,	1886
	Dr J. J. Graham Brown, 3 Chester Street, <i>Secretary,</i>	1878
25	Dr J. Murdoch Brown, 9 Walker Street,	1885
	Dr Alexander Bruce, 13 Alva Street,	1883
	Dr Lewis C. Bruce, Royal Asylum, Morningside,	1895
	Dr Buist, 1 Clifton Crescent,	1877
	Dr T. M. Burn-Murdoch, 14 Charlotte Square,	1886
30	Dr Cadell, 22 Ainslie Place, <i>Vice-President,</i>	1870
	Dr Francis M. Caird, 21 Rutland Street,	1883
	Dr H. L. Calder, 60 Leith Walk, Leith,	1884
	Dr James Cameron, 13 Fettes Row,	1895
	Dr Cappie, 37 Lauriston Place,	1855
35	Dr Edward Carmichael, 21 Abercromby Place,	1887
	Dr J. Carmichael, 22 Northumberland Street, <i>Vice-President,</i>	1870
	Dr C. W. Cathcart, 8 Randolph Crescent,	1883

		Date of Admission.
	Dr J. G. Cattanach, 3 Alvanley Terrace, . . . . .	1895
	Dr T. F. S. Caverhill, 16 Randolph Crescent, . . . . .	1883
40	Professor John Chiene, 26 Charlotte Square, . . . . .	1867
	Dr J. A. Clark, 4 Cambridge Street, . . . . .	1893
	Dr Church, 36 George Square, . . . . .	1876
	Dr Clouston, Tipperlinn House, Morningside Place, . . . . .	1861
	Dr Cotterill, 24 Manor Place, <i>Secretary</i> , . . . . .	1878
45	Dr William Craig, 71 Bruntsfield Place, <i>Vice-President</i> , . . . . .	1869
	Dr Halliday Croom, 25 Charlotte Square, . . . . .	1870
	Dr G. Matheson Cullen, 48 Lauriston Place, . . . . .	1892
	Dr A. S. Cumming, 18 Ainslie Place, . . . . .	1884
	Dr John Cumming, 94 Gilmore Place, . . . . .	1894
50	Dr R. J. B. Cunynghame, 18 Rothesay Place, . . . . .	1868
	Dr T. B. Darling, 13 Merchiston Place, . . . . .	1887
	Dr M. Dewar, 24 Lauriston Place, . . . . .	1885
	Dr George Dickson, 9 India Street, . . . . .	1884
	Dr Kenneth M. Douglas, 26 Rutland Street, . . . . .	1888
55	Dr J. W. Dowden, 22 Melville Street, . . . . .	1893
	Dr John Duncan, 8 Ainslie Place, . . . . .	1868
	Dr John A. H. Duncan, 32 Morningside Drive, . . . . .	1895
	Dr Kirk Duncanson, 22 Drumsheugh Gardens, . . . . .	1871
	Dr H. M. Dunlop, 20 Abercromby Place, . . . . .	1883
60	Dr J. C. Dunlop, 24 Stafford Street, . . . . .	1892
	Dr J. Dunsmure, 53 Queen Street, . . . . .	1872
	Dr George Elder, 7 Leopold Place, . . . . .	1896
	Dr William Elder, 4 John's Place, Leith, . . . . .	1892
	Dr R. W. Felkin, care of Mr Clay, 18 Teviot Place, . . . . .	1885
65	Dr J. Haig Ferguson, 25 Rutland Street, . . . . .	1885
	Dr W. A. Finlay, St Helen's, Russell Place, Trinity, . . . . .	1875
	Dr Andrew Fleming, 8 Napier Road, . . . . .	1880
	Dr R. A. Fleming, 10 Chester Street, . . . . .	1890
	Dr Foulis, 34 Heriot Row, . . . . .	1875
70	Dr J. S. Fowler, 42 Henderson Row, . . . . .	1895
	Dr John Fraser, 19 Strathearn Road, . . . . .	1878
	Professor Thomas R. Fraser, 13 Drumsheugh Gardens, . . . . .	1865
	Dr Garland, 53 Charlotte Street, Leith, . . . . .	1873
	Dr G. A. Gibson, 17 Alva Street, . . . . .	1880
75	Dr A. B. Giles, 1 Kew Terrace, . . . . .	1893
	Dr A. Lockhart Gillespie, 23 Walker Street, . . . . .	1891
	Dr J. Allan Gray, 107 Ferry Road, . . . . .	1879
	Professor Greenfield, 7 Heriot Row, . . . . .	1886
	Dr David Greig, 38 Coates Gardens, . . . . .	1854
80	Dr David M. Greig, 25 Tay Street, Dundee, . . . . .	1892
	Dr G. L. Gulland, 6 Alva Street, . . . . .	1888
	Dr A. C. Guthrie, 171 Constitution Street, Leith, . . . . .	1890
	Dr William Guy, 11 Wemyss Place, . . . . .	1890
	Dr William Haldane, Viewforth, Bridge of Allan, . . . . .	1889
85	Dr John Hardie, 12 Newington Road, . . . . .	1895
	Dr D. Berry Hart, 29 Charlotte Square, . . . . .	1886
	Dr James Harvey, 7 Blenheim Place, . . . . .	1893
	Dr Henry Hay, 7 Brandon Street, . . . . .	1884
	Dr John Henderson, 7 John's Place, Leith, . . . . .	1848
90	Mr J. W. B. Hodsdon, 52 Melville Street, . . . . .	1883
	Dr George Hunter, 33 Palmerston Place, . . . . .	1876
	Dr Husband, 4 Royal Circus, . . . . .	1849
	Dr J. Hutcheson, 44 Moray Place, . . . . .	1890
	Dr Robert Inch, Gorebridge, . . . . .	1887
95	Dr R. W. Inkster, 38 Montgomery Street, . . . . .	1895
	Dr W. Wotherspoon Ireland, Mavisbush House, Polton, . . . . .	1893
	Dr Alex. James, 10 Melville Crescent, . . . . .	1877
	Dr Allan Jamieson, 35 Charlotte Square, . . . . .	1876

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	1889
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150	1874
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155	1862
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		Date of Admission.
	Dr T. R. Ronaldson, 3 Bruntsfield Terrace, . . . . .	1877
160	Dr R. M. Ronaldson, 17 Morningside Road, . . . . .	1895
	Dr William Russell, 3 Walker Street, . . . . .	1884
	Professor Rutherford, 14 Douglas Crescent, . . . . .	1866
	Dr E. G. Salt, 50 George Square, . . . . .	1895
	Dr James Scott, 32 St Patrick Square, . . . . .	1895
165	Dr Andrew Semple, 10 Forres Street, . . . . .	1883
	Dr Theodore Shennan, 71 Leamington Terrace, . . . . .	1897
	Dr J. Sibbald, 18 Great King Street, . . . . .	1859
	Professor Simpson, 52 Queen Street, . . . . .	1859
	Dr A. A. Scot Skirving, 29 Drummond Place, . . . . .	1897
170	Dr A. T. Sioan, 22 Forth Street, . . . . .	1885
	Dr Andrew Smart, 35 Lauriston Place, . . . . .	1865
	Dr G. D. Smith, 148 Ferry Road, . . . . .	1877
	Dr James Smith, 1 Parson's Green Terrace, . . . . .	1891
	Dr John Smith, 11 Wemyss Place, . . . . .	1856
175	Dr J. Cormack Smith, 9 Brunton Place, . . . . .	1896
	Dr William Smith, 14 Hartington Gardens, . . . . .	1890
	Dr John Stevens, 2 Shandon Street, . . . . .	1892
	Professor Sir T. Grainger Stewart, 19 Charlotte Square, . . . . .	1861
	Dr J. S. Stewart, 15 Merchiston Place, . . . . .	1885
180	Dr Robert Stewart, 42 George Square, . . . . .	1892
	Dr William Stewart, 146 Ferry Road, Leith, . . . . .	1889
	Dr H. J. Stiles, 5 Castle Terrace, . . . . .	1889
	Dr S. Stirling, 4 Coates Crescent, . . . . .	1891
	Professor R. Stockman, University of Glasgow, . . . . .	1891
185	Dr A. Stodart-Walker, 30 Walker Street, . . . . .	1894
	Dr John Strachan, Dollar, . . . . .	1867
	Dr C. A. Sturrock, Dunfermline, . . . . .	1894
	Dr Allan C. Sym, 144 Morningside Road, . . . . .	1889
	Dr William G. Sym, 50 Queen Street, . . . . .	1889
190	Dr W. Taylor, 12 Melville Street, . . . . .	1871
	Dr C. C. Teacher, 16 Newington Road, . . . . .	1887
	Dr C. H. Thatcher, 8 Melville Crescent, . . . . .	1876
	Dr R. Thin, 38 Albany Street, . . . . .	1890
	Dr Alexis Thomson, 32 Rutland Square, . . . . .	1887
195	Dr John Thomson, 14 Coates Crescent, . . . . .	1887
	Dr John Tod, 93 Ferry Road, Leith, . . . . .	1895
	Dr Batty Tulke, 20 Charlotte Square, . . . . .	1864
	Dr F. J. Turnbull, 6 Randolph Place, . . . . .	1896
	Dr Dawson Turner, 37 George Square, . . . . .	1890
200	Dr Logan Turner, 20 Coates Crescent, . . . . .	1892
	Dr Underhill, 8 Coates Crescent, . . . . .	1872
	Dr Norman Walker, 7 Manor Place, . . . . .	1891
	Dr D. Wallace, 11 Rutland Street, . . . . .	1887
	Dr Douglas C. Watson, 19 Rutland Street, . . . . .	1894
205	Dr P. H. Watson, 16 Charlotte Square, . . . . .	1856
	Dr A. D. Webster, Belleville Lodge, S. Blacket Place, . . . . .	1883
	Dr George R. Wilson, Mavisbank, Polton, . . . . .	1892
	Dr J. Lockhart Wilson, Duns, . . . . .	1888
	J. L. Wilson, Esq., 4 Buccleuch Place, . . . . .	1883
210	Dr T. D. Wilson, 10 Newington Road, . . . . .	1880
	Dr Russell E. Wood, 9 Darnaway Street, . . . . .	1883
	Dr W. Fraser Wright, Bonnington Mount, Bonnington Ter., . . . . .	1894
	Dr John Wyllie, 44 Charlotte Square, . . . . .	1868
	Dr J. Y. Simpson Young, 8 Alva Street, . . . . .	1891
215	Dr P. A. Young, 25 Manor Place, . . . . .	1870
	Dr R. J. Erskine Young, 8 Alva Street, . . . . .	1892



(b.) **Members Exempted under Rule V. from paying  
the Annual Subscription.**

	Date of Admission.
	1887
	1887
	1882
220	1887
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225	1895
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260	1893
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265	1895
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		Date of Admission.
	Professor Gamgee, 8 Avenue de la Garve, Lausanne, Switzerland, . . . . .	1863
	Dr William Gayton, Bartram Lodge, Fleet Road, Hampstead, London, N.W., . . . . .	1886
270	Dr F. M. Graham, Simla, India, . . . . .	1894
	Dr W. C. Greig, Tangier, Morocco, . . . . .	1884
	Dr George K. Grimmer, South Queensferry, . . . . .	1897
	Dr Groesbeck, Cincinnati, . . . . .	1875
	Dr W. B. T. Gubbin, Bardolph, near Hertford, . . . . .	1893
	His Excellency Dr R. H. Gunning, 12 Addison Crescent, Kensington, London, W., . . . . .	1846
275	Dr John Haddon, Honeyburn, Hawick, . . . . .	1883
	Dr Archibald Hall, Montreal, . . . . .	1853
	Professor D. J. Hamilton, The University, Aberdeen, . . . . .	1876
	Dr J. W. Hamp, Penn Road, Wolverhampton, . . . . .	1887
	Dr A. W. Hare, 10 Cleveland Parade, Darlington, . . . . .	1883
280	Dr J. Home-Hay, Alloa, . . . . .	1880
	Professor J. Berry Haycraft, 1 St Andrew's Place, Cardiff, . . . . .	1889
	Dr Stanley Haynes, Malvern, Worcestershire, . . . . .	1864
	Dr R. Dundas Helm, 3 Alfred Street N., Portland Square, Carlisle, . . . . .	1892
	Dr R. E. Horsley, Jud-Falls, Stoneyhurst, Lancashire, . . . . .	1886
285	Professor A. W. Hughes, King's College, London, . . . . .	1889
	Dr James Hunter, St Catherine's, Linlithgow, . . . . .	1890
	Dr W. Hunter, 54 Harley Street, Cavendish Square, London, W., . . . . .	1887
	Dr J. Carlyle Johnstone, The Asylum, Melrose, . . . . .	1882
	Dr D. W. Johnston, P.O. Box 2022, Johannesburg, South Africa, . . . . .	1893
290	Dr James Johnston, 53 Princes Square, Bayswater, London, W., . . . . .	1871
	Dr J. Keay, District Asylum, Inverness, . . . . .	1887
	Dr A. J. Keiller, North Berwick, . . . . .	1889
	Dr George Keith, Moidart Cottage, Currie, . . . . .	1845
	Dr Skene Keith, 42 Charles Street, Berkeley Square, London, W., . . . . .	1885
295	Dr W. Scott Lang, . . . . .	1886
	Dr Herbert Littlejohn, Scarborough, . . . . .	1892
	Dr W. H. Lowe, Woodcote Lodge, Inner Park, Wimbledon, Surrey, . . . . .	1845
	Dr Robert Lucas, Dalkeith, . . . . .	1875
	Dr F. R. Macdonald, Inveraray, . . . . .	1860
300	Dr K. N. Macdonald, 21 Clarendon Crescent, . . . . .	1880
	Dr W. B. Macdonald, Dunbar, . . . . .	1888
	Dr John A. Macdougall, Cannes, France, . . . . .	1875
	Professor J. M'Fadyean, 101 Great Russell Street, London, W.C., . . . . .	1888
	Dr John Mackay, Aberfeldy, . . . . .	1881
305	Dr W. B. Mackay, 23 Castle Gate, Berwick-on-Tweed, . . . . .	1893
	Professor M'Kendrick, The University, Glasgow, . . . . .	1870
	Dr James Mackenzie, 66 Bank Parade, Burnley, Lancashire, . . . . .	1894
	Dr W. O. M'Kenzie, D.I.G.H., 37 Belsize Park Gardens, Hampstead, London, N.W., . . . . .	1845
	Dr T. J. Maclagan, 9 Cadogan Place, Belgrave Square, London, S.W., . . . . .	1875
310	Dr Roderick M'Laren, 23 Portland Square, Carlisle, . . . . .	1882
	Dr John Macpherson, Stirling District Asylum, Larbert, . . . . .	1891
	Dr J. W. Martin, Burnfoot, Cluden, Dumfries, . . . . .	1888
	Dr A. Matthew, Corstorphine, . . . . .	1882
	Dr J. Moolman, Cape of Good Hope, . . . . .	1877
315	Dr E. C. Moore, . . . . .	1892

## ALPHABETICAL LIST OF MEMBERS OF THE SOCIETY xxiii

	Date of Admission.
	1889
	1882
	1857
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320	1879
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	1884
	1884
	1873
325	1893
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360	1884
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365	1893
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	1886

	Date of Admission.
Dr Oswald G. Wood, <i>Indian Army</i> , . . . . .	1886
Dr G. Sims Woodhead, 1 <i>Nightingale Lane, Balham, London</i> , <i>S. W.</i> , . . . . .	1883
370 Dr Yellowlees, <i>Gartnavel Asylum, Glasgow</i> , . . . . .	1862
Professor John Young, <i>The University, Glasgow</i> , . . . . .	1860

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N.B.—Members are requested to communicate with the Secretaries if they discover any errors or omissions in the List, and also to intimate all changes in their addresses.

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TRANSACTIONS  
OF THE  
MEDICO-CHIRURGICAL SOCIETY  
OF EDINBURGH

FOR SESSION LXXVI., 1896-97

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Meeting I.—November 4, 1896

DR ARGYLL ROBERTSON, *President, in the Chair*

I. ELECTION OF MEMBER

The following gentleman was elected an Ordinary Member of the Society :—John Anderson, M.B., C.M., Pitlochry.

II. ELECTION OF OFFICE-BEARERS

The following gentlemen were elected office-bearers :—*President*, Dr Argyll Robertson ; *Vice-Presidents*, Dr William Craig, Dr James Carmichael, and Dr Francis Cadell ; *Council*, Drs T. S. Clouston, A. D. Webster, G. A. Gibson, H. F. Calder, Joseph Bell, J. W. B. Hodsdon, Milne Murray, and Noël Paton ; *Treasurer*, Dr M'Kenzie Johnston ; *Secretaries*, Dr Graham Brown, Mr J. M. Cotterill ; *Editor of Transactions*, Dr William Craig.

III. EXHIBITION OF PATIENTS

1. *Dr James* exhibited a CASE OF RICKETS beginning at the age of seventeen years. (This case is fully described in the

January number of *The Scottish Medical and Surgical Journal*.) Here it need only be stated that the patient was a lad of 20, and that there was no doubt that the malady had commenced a little over three years before. The patient showed the characteristic rickety chest, a very large head, and thickenings at the ends of the long bones, with evidence of bendings. What was specially noticeable, however, was the involvement of the bones of the metacarpus and phalanges. By the Röntgen rays it had been discovered that all those bones were markedly deficient in mineral matter. The corresponding bones of the foot were also affected, but to a much less extent, as well seen in the accompanying illustrations.

2. *Mr Caird* showed two patients.

(a) GASTRO-JEJUNOSTOMY, performed for extensive carcinoma of the pylorus and lymphatic glands.

Mr M., æt. 51, had suffered for twelve months from continuous abdominal pain with nocturnal exacerbations, constipation, and emaciation. The stomach was found to be dilated and contained sarcinæ and free hydrochloric acid. There was tenderness over the pyloric region with an ill-defined resistance.

Admitted to Royal Infirmary, August 24th, 1896; operation, August 27th.

The patient has now gained weight, can eat anything, and is free from pain and constipation.

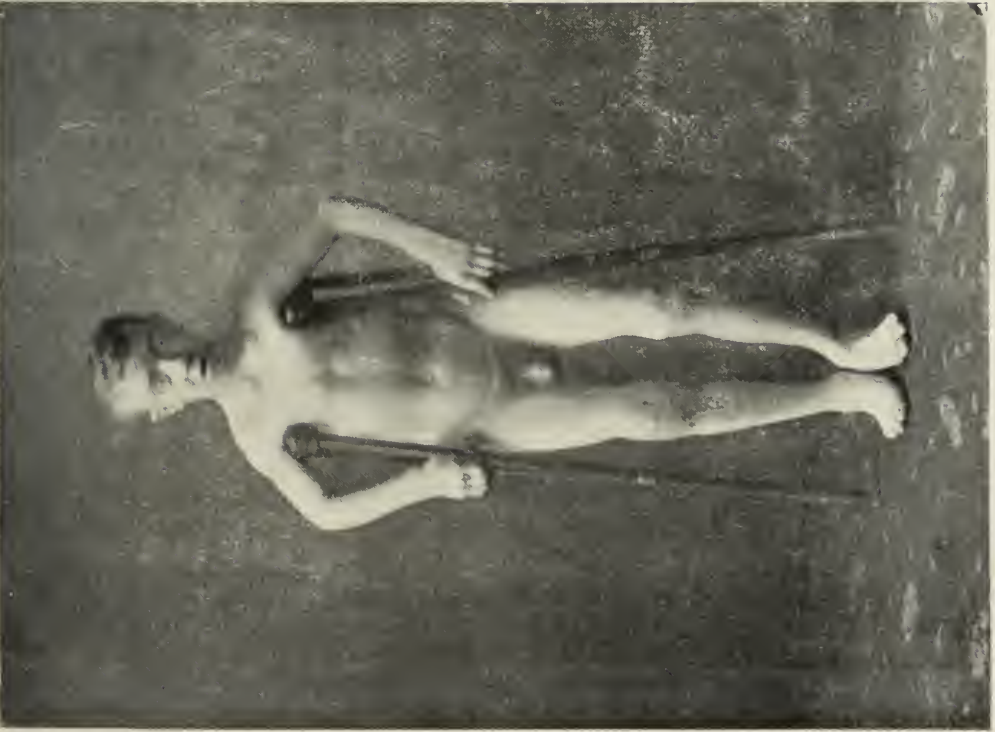
(b) EXCISION OF THE PYLORUS for carcinoma. Kocher's method. J. M'C., æt. 62, had complained for two years of indigestion, increasing pain, worst at night, great thirst, and gradual emaciation. There was but little gastric dilatation, and free hydrochloric acid was diminished in amount.

Admitted 12th September; operation, 14th September. Good recovery. He is now apparently hale and well, and his symptoms have disappeared.

Both cases were fed with nips of milk and potash from the day following the operation onwards. Silk sutures were employed as the uniting medium.

3. *Dr Byrom Bramwell* exhibited a case of GENERAL PARALYSIS OF THE INSANE in a female aged 19, the patient's sister presenting all the characteristic appearances of congenital syphilis, and gave the following description of the case:—





DR JAMES' CASE OF RICKETS.



H. C., aged 19, unmarried, was admitted to Ward 27, Edinburgh Royal Infirmary, on 5th June 1896, on account of difficulty in speaking and mental dulness.

*Previous History.*—The history which her mother, who brought her to the Hospital, gave us was as follows :—

For the last two years at least the patient's mental faculties have been gradually failing. She has become much more stupid than she used to be, and much more quiet. She will sit for hours doing nothing. She has gradually lost her interest in her surroundings, and has ceased to read and write. Her memory has become very much impaired ; her mother says that she frequently repeats questions which she has asked a few minutes previously. She has, too, been very drowsy ; she often falls asleep in her chair. This, however, is not a new symptom ; she has manifested it for some years, but it has been much worse lately.

The patient is emotional, and cries on the slightest provocation. Her mother states that, with the exception of the mental dulness and apathy, she has not noticed any marked change in her character. She is very conscientious over her work, and worries about being in good time going to it.

At times she gets excited, and, when excited, articulation becomes much worse. She is much more excitable than she used to be before her illness commenced.

She has never manifested any delusions or grandiose ideas ; but she will never admit that there is anything the matter with her ; whenever she is asked how she is, she says she is quite well.

She was never a bright child, but managed to do fairly well at school. Up to the age of 13 she went to school regularly, and got on sufficiently well to pass into the fifth standard. Soon after this, by the advice of her teacher, she was taken away from school ; he thought the work in the fifth standard was too much for her.

On several occasions the patient has fallen down in the street, her mother thinks in consequence of giddiness or faintness ; the first attack occurred four years ago, a second last autumn. She has never had any convulsive seizure. Since the beginning of the present year she has frequently stumbled and fallen on the street, and on going up or down stairs.

The difficulty in speaking was first noticed about two years

ago. It has slowly progressed since, and has got much worse since the beginning of the present year.

She used to knit well, but now knits very badly. Her mother says that she is very bad with her fingers, her writing in particular being defective.

Since her illness commenced she has become stouter in body, but there has been no distinct alteration in her facial expression.

During the past two years the appetite has been variable ; it has never been excessive. The digestive functions appear to have been normal.

During the past two years the patient has suffered occasionally from headache ; the pain occurs about once a month, and lasts for a few hours at a time. The pain is chiefly referred to the frontal region, and seems to be of the nature of megrim. She has, too, occasionally suffered from vomiting, which usually, but by no means always, accompanied the headache. The vomiting was unassociated with the taking of food, and sometimes occurred when she rose in the morning.

She has never menstruated.

For nine months after she left school she was employed as a message girl for a draper. She was then apprenticed as a bookfolder, and was employed in this occupation for three years. After this she worked in a biscuit manufactory.

About three months ago she was lifting biscuit boxes, and a number of the empty boxes fell on her head, but she does not seem to have sustained any severe injury.

*Previous history, prior to the commencement of the present illness.*—The patient had scarlet fever at the age of 4, and measles, followed by whooping cough, at the age of 5. She has been rather subject to sore throats. In the beginning of 1895 she had an attack of shingles. Up to the age of 14 she suffered from nocturnal incontinence of urine which stopped suddenly, and has never returned since. When she was about 12 years of age her sight became impaired ; she consulted Dr Sym at the Infirmary, who prescribed glasses.

*Social History.*—Her social surroundings have been satisfactory. She has always had plenty of good food. The house in which she lives is dry and comfortable.

*Family History.*—Her father, aged 55, is alive and healthy. He was much addicted to drink about and before the time

when the patient was born. Her mother, aged 55, has suffered from heart trouble since an attack of influenza a few years ago. There have been thirteen children in the family. The ages are as follows:—

(1) Female, aged 34, quite healthy; she is married and has four children, all of whom are strong and well.

(2) Female, aged 32, single. General health good; at the age of 30 suffered from a "sore knee," said to be rheumatic in character; it is still stiff.

(3) Female, aged 28, married. Died of kidney disease. She had three children; one died from teething; the survivors are healthy.

(4) Female, died at the age of 3 weeks, of dropsy.

(5) Male, born dead at the 7th month.

(6) Female, born dead at the 7th month.

(7) Female, died at the age of  $18\frac{3}{4}$  of general dropsy; was never strong; knee-joint disease developed when she was nine years old; abscesses formed; the joint became contracted.

(8) Male, died two days after birth, the doctor said from bile.

(9) Female, aged  $21\frac{3}{4}$ , strong and healthy.

(10) The *patient*, affected with general paralysis of the insane.

(11) Male, aged 17; looks strong and healthy; is short-sighted; no signs of congenital syphilis.

(12) Female,  $14\frac{1}{2}$ ; presents all the characteristic physiognomic appearances of congenital syphilis.

At the age of four disease of the knee joint developed. The knee was excised by Dr Maclaren when she was ten years old. At the age of four she also became blind and deaf. She was completely blind for three months after the eye affection developed. Both cornea are now markedly opaque, the result of interstitial keratitis. Her sight has improved considerably of late years. Her hearing has not improved; she is still almost stone deaf. The nose is depressed, the forehead is broad, the frontal eminences prominent. Scars are present on each cornea. The teeth are characteristic, the lateral incisors in the upper jaw being very sharp and peg-shaped; the central incisors are small, but not notched. The complexion is earthy. The skin is coarse. There are fine white scars at the angle of the mouth.

(13) Male, aged 12; a big, stout boy. His head is very

large (circumference,  $24\frac{1}{2}$  inches). The forehead is remarkably broad and square, the frontal eminences very prominent. He presents no other signs of congenital syphilis, unless perhaps in the teeth; the lateral incisors in the upper jaw are very peg-shaped; the single central incisor which is present (the other was knocked out some time ago) is large and well-shaped.

So far as is known, none of the members either of the father's or mother's families have suffered from any nervous disease.

*Present condition.*—The patient is short, broad, well-nourished, and not in the least anæmic. She looks younger than her age. There are patches of ichthyosis on both knees. The temperature is subnormal. The circulatory, respiratory, digestive, and urinary organs are all normal. On heating the urine, a moderate precipitate of phosphates is thrown down.

*Nervous system.*—The patient has a somewhat vacant and silly expression.

Her mental faculties are profoundly impaired; the condition may be said to be that of moderate dementia. She is dull and apathetic; she takes little interest in what is going on around her. Her memory is very defective. She is unable to perform the simplest arithmetical calculations; for example, she could not tell me what twice three was, and could not add up the figures. In short, my examination fully confirms the statement of her mother (see previous history), which accurately represent the patient's mental condition. It is unnecessary to repeat the details here.

The articulation is very indistinct, and quite characteristic of general paralysis.

Fine tremors occur in the lips and facial muscles during efforts of articulation. When the patient begins to speak, she often puckers up her forehead and looks somewhat distressed and anxious.

The tongue is markedly tremulous. When the patient is told to put out her tongue, she hesitates for some time, then it is jerked out suddenly, and so long as it is protruded it is affected with fine rhythmical tremors.

The writing is very markedly affected—irregular, from a fine tremor of the fingers.

The pupils are equal in size and moderately dilated; they

contract, somewhat sluggishly to light, normally on efforts of accommodation. The patient is myopic. There are no changes in the fundus suggestive of inherited syphilis. Dr Sym kindly examined the eyes on 29th October 1896, and confirmed my examination. His report is as follows:—

“I have with great difficulty examined the case of general paralysis which you sent down.” (The patient has great difficulty in fixing and keeping the eyes steady.) “I find the discs to be slightly pale, but part of the pallor is *apparent*, and due to the myopia which is present. The same fact makes the vessels look rather small, but I do not consider them to be pathologically reduced. The pigment of the whole fundus is irregular and patchy, but I could find no portions suggestive either of disseminated choroiditis, retinitis pigmentosa, or other distinct lesion.

“There is a narrow staphyloma posticum, and the pigment immediately outside it is disturbed-looking and irregular.”

There is no obvious paralysis either in the facial or any other muscles. The gait presents nothing characteristic. The knee-jerks are normal and equal. The plantar reflex is slight.

*Treatment.*—The patient was treated with large doses of iodide of potassium, twenty grains three times a day. She remained in hospital until June 1st. At the date of her discharge there was no improvement either in the mental or the physical symptoms.

She continued to take the medicine as an out-patient.

*Re-admission.*—She was re-admitted to the Infirmary on 3rd October 1896, and the following note was made:—There is no improvement; in fact, the mental deterioration, the characteristic tremor in the tongue and facial muscles, the defective articulation and the writing are all worse.

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## IV. LANTERN DEMONSTRATIONS

1. *Drs Bruce and Muir* gave a lantern demonstration of a DESCENDING TRACT in the posterior columns of the spinal cord in the lumbo-sacral region, and also of sections of the cord from a case of AMYOTROPHIC LATERAL SCLEROSIS, of which Dr Alexander Bruce has given the following description:—

In his classical work on the "Leitungsbahnen im Gehirn und Rückenmark des Menschen," Flechsig divided the lateral columns of the cord into the crossed pyramidal tract, the direct ascending cerebellar tract, the lateral ground bundles (*Seitenstrangreste*), and the lateral limiting layer (*Seitliche Grenzschrift*). Of these the crossed pyramidal and direct cerebellar tracts occupy perfectly defined positions; but the



FIG. 1.

other two, which form the remainder of the lateral columns, are very imperfectly differentiated from each other. Consequently there is much vagueness of statement with regard to their boundaries, and such statements as are made appear to be in a large measure arbitrary. The lateral limiting layer is stated by Flechsig to vary in its position with different levels of the

cord. In the upper cervical region it lies on the outer side of the anterior cornu, extending from the anterior group of the ganglion cells to the posterior margin of the cornu. In the cervical enlargement it occupies the angle between the anterior and posterior cornua. In the dorsal region its anterior part again passes forwards and forms a layer on the outer side of the anterior cornu rather thinner than that in the upper cervical region. In the lumbar region its relations are not so clear.

While a further subdivision of the lateral ground-bundles (*Seitenstrangreste*) has since been made by the discovery of the ascending antero-lateral tract by Gowers, and the descending lateral-fillet-tract by Ferrier and Turner (not to mention the still problematical descending cerebellar tract of Löwenthal), no such differentiation has hitherto been attempted in the case



of the lateral limiting layer. It is true that Flechsig states that this layer does not form a single system, and that, in the cervical enlargement, in the dorsal and the upper lumbar regions, certain bundles of fibres are found in the angle between the anterior and posterior cornua and along the outer side of the latter. These fibres are in part continuations of the posterior roots, and in part are derived from the column of Clarke. They lie partly between the grey substance and the lateral limiting layer proper, and partly intermingled with the fibres of the latter. The lateral limiting layer otherwise was supposed to be formed by fibres of short course.

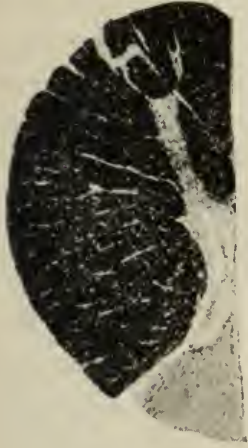


FIG. 2.

Although Edinger (in his "Zwölf Vorlesungen," 4th edition, p. 137) supports this view, it is, however, probable that fibres from the posterior roots do not enter into the lateral limiting layer. Careful examination of sections of cords from advanced tabes affecting the lumbar and dorsal regions

(Figs. 3 and 2), and also others in which the cervical region is involved (Fig. 1), shows that although the posterior root fibres are degenerated, there is no change whatever in any part of the lateral limiting layer, as would undoubtedly have been the case had there been any continuation of posterior roots into the latter. Further, in sections made at a level immediately above a transverse crush of the cord in the lower dorsal region, in which the posterior roots and the postero-external columns of the cord were degenerated, no indication of degeneration was found in the lateral limiting layer. It is well known, also, that fibres belonging to the direct cerebellar tract are found in the lateral limiting layer only in the dorsal and not in the lower lumbar or in the cervical regions. Further, the evidence furnished by the recent researches of Cajal (see his diagrams, Figs. 1 and 2, "Atlas der Pathologischen Histologie des Nervensystems," part iv.) as to the constitution of this tract, goes to show that it is composed of fibres which arise from



FIG. 3.

ganglion cells in the anterior and posterior cornua, and which, after a short course (either upward or downward) return again to the grey matter. It has not, however, hitherto been shown how much of the tract is in connection with the anterior, and how much with the posterior cornu. This could manifestly only be done if the cells in the one cornu disappeared or were destroyed, while those in the other remained intact. It is impossible to produce such a condition experimentally, without at the same time injuring the lateral limiting layer. The only method at present available is to examine cords from cases of degeneration of the anterior cornual cells (no known disease, except syringomyelia, ever affects specially the cells in the posterior cornua).

Such an opportunity has been recently afforded me in the study of a case of amyotrophic lateral sclerosis. In this disease it is not merely, as was first described by Charcot, the pyramidal tracts, the motor nerve cells in the anterior cornua, and the anterior nerve roots that are degenerated, but also

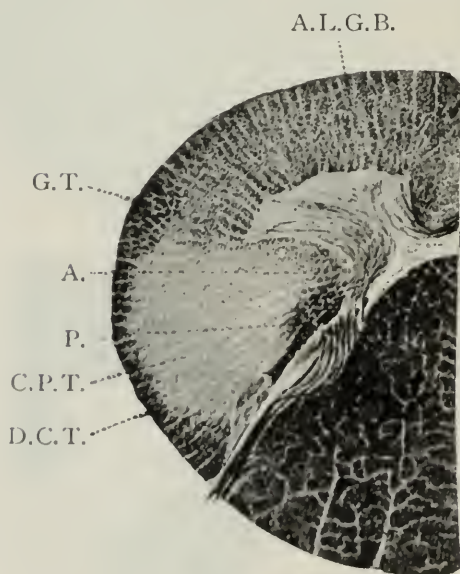


FIG. 4.

the greater part of the antero-lateral columns, with the exception of the ascending tracts, namely the direct cerebellar tract and the ascending antero-lateral tract of Gowers. This degeneration can be distinctly shown by Marchi's or Weigert-Pal's method, and by means of carmine or aniline blue-black (English) it is easy to demonstrate a certain increase of neuroglia, although to a less marked extent than in the crossed pyramidal tract, owing, no doubt, to the fact that there

is a relatively smaller number of degenerated fibres in the former system. The degeneration of fibres in the antero-lateral tract can only be explained as the result of atrophy of the motor "Strangzellen" in the anterior cornua. It is, however, not limited to the antero-lateral ground bundles, but affects also part of the lateral limiting layer. In sections stained by Weigert-Pal's or Wolters' method the anterior part of the

lateral limiting layer shows a degeneration equally advanced with that in the antero-lateral ground bundles, while the posterior part of the layer remains

deeply stained and contrasts sharply with the anterior portion. The relative areas covered by the degenerated and the undegenerated fibres will be best seen by studying Figures 4, 5 and 6. They are most clearly seen in the cervical and dorsal regions, less so in the lumbar region, owing to the fact that the atrophy in the anterior cornual cells, and consequently the degeneration in the antero-lateral ground bundles and lateral limiting layer, is less marked.

The contrast, therefore, between the degenerated and undegenerated parts of the lateral limiting layer, although it can still be made out, is not so distinct as in the cervical and dorsal regions. The undegenerated area lies immediately external to the posterior horn, extending from its base to almost as far as the posterior extremity of the horn. It is bounded externally in the cervical and dorsal regions by the crossed pyramidal tract. Its form is that of a club, the head of which lies most anteriorly, in the angle between the anterior and posterior cornua, while the handle passes backwards along the side of the posterior horn. The position of the head of this club varies with different levels of the cord. It may be said in general to occupy a more anterior position the lower the level of the cord at which it is examined. Thus in the cervical enlargement (Fig. 4) it is situated behind the innermost point of the angle between the anterior and posterior cornu, and quite behind the posterior commissure. In the

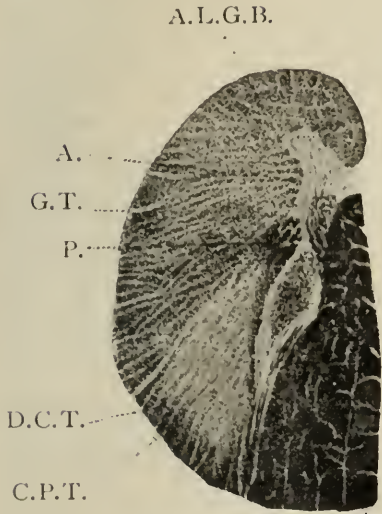


FIG. 5.

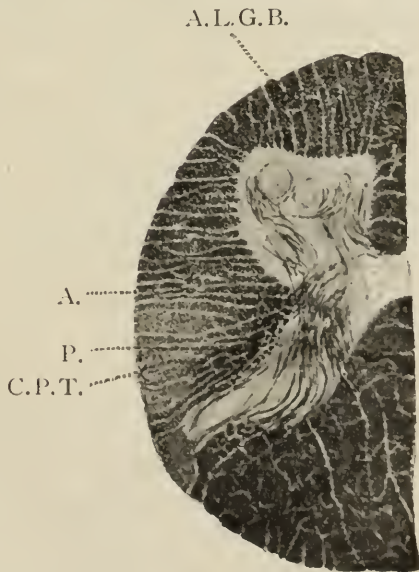


FIG. 6.

dorsal region (Fig. 5) it occupies the innermost point of the angle, even touching the anterior cornu, but still lying slightly behind the posterior commissure. In the lumbar enlargement it extends as far forwards as the innermost point of the angle, but this latter is itself now at a level in front of the posterior commissure (Fig. 6). Sections stained with Marchi's method show that the undegenerated area contains a few degenerated fibres, so that it cannot be said to be perfectly differentiated from the anterior part of the limiting layers; but whereas there is an increase of neuroglia in the anterior portion there is none detectable in the coarser reticulum which separates the fibres in the posterior part.

As already stated, it seems probable that the degenerated fibres in the lateral limiting layer are connected with the anterior cornua, and that the undegenerated fibres in the posterior part are derived mainly from the posterior cornua. If this is so, then the lateral limiting layer must be regarded as consisting of two almost completely independent systems which merely agree in this, that they arise in cells in the grey matter, and are fibres of short course. If it is thought under such circumstances desirable to retain the term lateral limiting layer, its constituent parts might be termed respectively *ventro-lateral* and *dorso-lateral limiting layer*.

#### EXPLANATION OF THE PLATES.

Figs. 1, 2, 3. Hemi-sections of cervical, dorsal, and lumbar regions of the cord from three different cases of locomotor ataxia. Stained by Pal's method to show the degeneration of posterior roots and posterior columns, with complete integrity of the lateral limiting layer.

Fig. 4. Transverse hemi-section of the cord. The cervical enlargement. Stained by the Weigert-Pal method.

A. Anterior or ventral part of the lateral limiting layer, degenerated.

P. Posterior or dorsal part of the lateral limiting layer, undegenerated.

A.L.G.B. Antero-lateral ground bundles.

T.G. Tract of Gowers.

D.C.T. Direct Cerebellar Tract.

C.P.T. Crossed Pyramidal Tract.

Fig. 5. Similar section from dorsal region.

Fig. 6. Similar section from lumbar region.

2. Drs Byrom Bramwell, Muir and Leith showed a number of lantern slides illustrative of the clinical and microscopic appearances of the muscles, spinal cord and peripheral nerves

in cases of pseudo-hypertrophic paralysis and myopathic muscular atrophy.

The clinical photographs represented a series of cases which had been under Dr Byrom Bramwell's care. Some of them had been exhibited at former meetings of the Society.

Some of the microscopic sections were made from portions of muscles removed during life; others from the muscles, spinal cords and peripheral nerves of three cases which had proved fatal.

*Dr Muir* also showed under the microscope a series of sections from which some of the microphotographs had been made.

## V. ORIGINAL COMMUNICATIONS

### I. THE TREATMENT OF CRIME

By ALEX. JAMES, M.D., F.R.C.P.Ed., Physician, Royal Infirmary, Lecturer on Practice of Medicine and Clinical Medicine, Edinburgh

WHEN a venerable, thoroughly common-sense, and thoroughly, and in the real and best sense of the word, Conservative periodical like *Blackwood's Magazine* opens its pages to an article on Criminology, it may be held as warranted that the consideration of the subject of Criminology has come quite within the limits of practical politics. When further there is found in its article on that subject, what is practically a corroboration of the assertion that, of the inmates of our prisons, the one half should never have been there, and the other half should never be anywhere else, it may also, I think, be warranted, that we are entitled to conclude that, in our methods of dealing with crime and with criminals, there is very much room for improvement.

Believing as I do most implicitly in Descartes' famous dictum, "S'il est possible de perfectionner l'espèce humaine, c'est dans la médecine qu'il faut en chercher les moyens," I feel that in asking the attention of this Society to the subject of the Treatment of Crime, I am not asking it to consider a subject which is in any way beyond its proper scope of interest and usefulness.

As you are all aware, the scientific study of the criminal is one of comparatively recent development. Already, however,

is it the case that the student, wishing to work up this subject, will find an immense amount of literature, and will find that literature rapidly increasing. It might be thought, therefore, that I should begin this paper by referring to the literature. I believe, however, that this would be simply an infliction on your patience, and I shall dismiss the subject of the literature with two short remarks. The first is that, for the opening up of the subject of criminology to scientific investigation, we are indebted mainly to Italian and French students—the Celt being in this, as in most other walks of life, the man who first breaks up new ground.

The second remark is that, whilst the opening up of this new ground was begun by the study of the criminal man as an individual, the anthropology of Lombroso and others, there is little doubt that this anthropological study has been and is of value, not so much in itself, as in its having been the initiating factor to something better, that is to say, to the study of the criminal from the sociological point of view. That the criminal man as an individual should have received more recognition than perhaps was deserved, is explained, I think, by what we often see in Nature—the swing of the pendulum. Up till recently, in the treatment of criminals, the crime was universally regarded as the sole object to which attention should be directed. It had never been believed possible that there exist individuals to whom so-called criminal acts are as natural as are legal acts to the general body of humanity. Lombroso and his followers recognised this, and hence they tended to devote the bulk of consideration to the anthropological aspect of the subject. Now, however, we have got a better grip of the whole matter, and we realise that in sociology—in the study of the relations of the individual to his neighbours, we are most likely to find what is truest and most valuable.

This is the aspect of the subject which I now propose to take up, and I shall consider along with you the subject of crime as related to insanity, pauperism, and disease.

When, amongst human beings, an individual has had the good fortune to be sent into the world with a good constitution, and when he has also the good fortune to find that the circumstances under which he is placed in his journey throughout life, are favourable, that individual is more or less certain to live to a good old age, and to enjoy almost, if not quite,

until the end, that pleasurable sensation of satisfaction with himself and all mankind which the feeling of well-being and soundness alone can give. But should the constitution be faulty, or the circumstances be unfavourable, or still more, should both of those elements to soundness be wanting, what is termed disease and premature death, is equally certain to occur.

Now, all observations show, that an ideally perfect constitution, and ideally perfect surroundings, are met with very rarely, and so that the normal duration of life is very seldom attained. But observations also show that there is an average duration of life. As civilisation is progressing, this average duration will certainly be more and more extended, and although we are forced to confess that the average health and longevity is not so good as it will be, we recognise that, as age has succeeded age, in the growth and development of human beings, it has gradually been improving, and that it is at the present day better than it has been at any time previously. When we look for the causes which have led to this gradual improvement in individual health and longevity, we realise that they are to be found in a gradually increasing knowledge of, and power of adaptation to, natural laws.

My purpose now is to show that just as individual life has been able to maintain itself more and more against the injurious effects of disease as the result of this knowledge, so it will be found that social life is becoming, as the result of this knowledge, more and more able to maintain itself against the injurious effects of what is called crime. Further, just as the individual life, although it is better than it has ever been before, is still far short of the ideal, so with the social life. Indeed, comparing the two, the individual and the social, the latter cannot but be regarded as being, of the two, by far the more backward. This is, as I shall endeavour to show, mainly because we have already realised that, in our efforts to benefit the individual life, we must act upon what are called purely scientific principles, whilst we have been, up till comparatively recently, in our efforts to improve social life, acting in more or less strict accordance with the superstitions and traditions of antiquity. Without more preamble, then, let me endeavour to lay before you some of the data from the consideration

of which we may be able to conclude as to the similarity of disease and crime.

1. Just as disease can be shown to occur and cause death in a certain wonderfully constant number of people year by year, so with insanity, crime and pauperism. Thus in Scotland, with its population of over four millions, it is found that each year some seventy odd thousands will die; that some eleven odd thousands will be taken care of as lunatics, with a yearly committal of about three thousand; that between two and three thousand will be taken care of in prisons, with a yearly committal of over fifty thousand; and that some ninety thousand will be paupers.

2. Just as different diseases occur and cut off individuals in a fairly regular manner each year, so will it be found to be the case with insanity and crime. Thus, just as in each year a certain proportion of the population dies of heart disease, brain disease, &c., so a certain proportion will suffer from mania or melancholia, and a certain proportion will be arrested for murder, theft, forgery, &c.

3. In disease, insanity and crime we recognise a like correspondence in the liability of the individual to one or other forms of these at different ages. Thus, *e.g.*, as regards disease, statistics show that bronchitis tends to occur mostly at the beginning and the end of life, phthisis mostly about the middle period, and heart disease later on. Lunacy statistics show that mania is associated with an earlier age than melancholia, and that general paralysis tends to occur still later. Criminal statistics show that crimes against persons occur at an earlier age than crimes against property.

4. Statistics of disease—insanity, crime and pauperism—show variations, depending on season, temperature, weather, &c. Thus the greatest amount of disease shows itself during the months of March, April and May, and the least during June, July, August and September. With crime, on the other hand, it is found that the number of ordinary prisoners is greatest during July, August, September and October, and is least during March, April and May. Insanity, like all other nervous diseases, tends to reach its maximum in the summer months of the year. Pauperism is greatest in the winter months, January, February, March, and is least in the warmer months, from April to September. The inter-relationship of



these statistics is an interesting study. There is no doubt that the antagonism between pauperism and crime is only to a certain extent an apparent one, the result of the fact that a certain proportion of the population gravitate between the poor-houses and the jails. In winter, when the conditions of life are hard, they realise it, and gravitate into the poorhouse. In summer, when the milder weather renders the conditions of life easier, they make an attempt at self-subsistence ; but, being unable to attain it for the most part in legitimate ways, they attempt it by illegitimate, and so become criminals. But there is no doubt that the larger proportion of criminals during the summer months is, like the prevalence of insanity and nervous diseases during those months, to be ascribed to the fact that the nervous system has then its equilibrium at the minimum of stability.

Another point which seems to be recognised in connection with the influence of season, is that it affects alike the form of the disease and the form of crime. Thus, whilst lung diseases are commonest in the colder months, and nervous and intestinal in the warmer, so it would seem that crimes against property are more numerous in winter, and crimes against persons more numerous in summer.

The conditions of trade, of race, of religion, &c., are all of interest in connection with disease, crime, and pauperism, and have all been investigated. On these matters I have no data of my own to offer. But it seems to be the case ; that, whilst in prosperous times, crimes against persons predominate as they do during warm weather ; in bad times, crimes against property are more numerous, as they are proportionately in cold weather. Ferri and others have pointed out that in those years when the winter cold is greatest, crimes against property are more numerous.

As regards race, all that need be said is that the criminals of a people, like their legislators and like their deities, are very much like themselves.

As regards religion, it is noteworthy that, as Laurent and others have pointed out, the criminal is usually a religious man. At any rate, it has been remarked that the proportionate number of avowed sceptics found in prisons is particularly small. That the criminal is a truly religious man is of course absurd, but it is quite comprehensible how the criminal, in order

to accomplish his purpose, is apt to appear as such. The man who appears to be a religious man is trusted by his neighbours, the man who makes no such profession is not only not trusted, but is often received with distrust on the part of those with whom he associates. To this is to be ascribed the marked frequency of such crimes as breaches of trust, fraudulent bankruptcy, etc., among professed religionists.

In this way, then, we must realise that, like disease, insanity and pauperism, crime is dependent on certain social factors, that, as Quetelet put it long ago, "The crime is the fault of society, the criminal is only the instrument." The progress of the evolution of society, like the progress of evolution of the individual living beings, means the survival of the fittest in the social struggle for existence. The man who is not fit, the man in whom the physical, moral and intellectual organisation is not equal to its requirements, must succumb, and will become a victim of organic disease, a criminal, a lunatic, or a pauper, according solely to differences in his constitutional state and surroundings.

Here, however, give me permission to make a little digression. I have spoken of the criminal as one who ethically is, as it were, behind the times in which he lives, as one who, in his endeavours to live, employs means which, justifiable enough according to the notions of a previous age, are not up to the legal standard of ethics of the age in which he lives. It must not be forgotten that there is another criminal. This is the man who, aiming at a standard of ethics in front of the age in which he lives, finds himself brought into opposition to the legal standard of ethics of his own age. Such a man, paying little regard to what is necessary for his own subsistence, being too altruistic, as it were, gives to the world more than he takes from it. He is oftenest a simple failure in life, but a very slight knowledge of history reveals to us that many of the finest examples of intellect and morality which the world has produced have been seized and executed as criminals.

Conversely a very slight knowledge of the world shows us that, in speaking of the survival of the fittest, we mean by the fittest, not the best ideals intellectually or ethically, but the best examples of the commonplace or average intelligence or morality. With this little qualification we may now proceed

to the consideration of the treatment of crime, on the theory that, like the victim of organic disease, the lunatic and the pauper, the criminal is one who fails to attain to the standard which the society in which he lives imposes upon him.

In this connection the first point to be emphasised is that we must get quit of the idea that the punitive element is of any but subsidiary importance, that we must treat the criminal from the point of view of his harmfulness or usefulness to society, and not from the point of view of his crime. In this connection we must not, as some indeed have done, imagine that the punitive element is of no use—we have direct scientific evidence of its usefulness. Recognising that criminal acts, and for that matter, insane acts as well, are to be regarded as the result of the action of the lower, less evolved centres being insufficiently controlled by the higher and more evolved ones, we may say that punishment acts in restraining improper conduct just as stimulation of the sciatic nerve of the frog inhibits the reflex action of its spinal cord. But as stated above, the punitive element should be subsidiary. It is simply repression, and repression from its simplest to its most drastic mode of employment, *i.e.* capital punishment, is a coarse way of securing improvement—is virtually an admission of impotence, and a mode which, as civilisation progresses, will become less and less favoured. At present the tendency is far too much to treat the crime, and too little to treat the criminal. We laugh at the Chinese because among them crimes of different degrees of heinousness are treated by correspondingly different degrees of thickness in the bamboo stick to be employed. But our own laws, which prescribe certain definite terms of imprisonment—days, weeks, months or years—for crimes of different degrees of heinousness, are perhaps less brutal, but equally unscientific, and possibly at times quite as cruel. The criminal then, and his relation to what is best for society, should be the main consideration whether the treatment is punitive or not.

In stating this, however, I am well aware that the crime as crime can never be lost sight of, for it alone can act as the stimulus, as it were, to set the law into action. Without the committal, real or supposed, of a crime, the law can take no steps, and hence, although in reality we may say that there is

no hard and fast line between the criminal and the normal man, the law must draw one.

But that in all times this too great regard for the crime, and too little for the criminal, has been acting injuriously, there is plenty of evidence. Let me give some examples of this.

In previous times, when capital punishment was still the punishment for crimes like theft, forgery, &c., there is no doubt that many guilty individuals who merited punishment escaped it. This was because the jury, knowing that their returning a verdict of guilty meant that the criminal would be hanged, preferred to return a verdict of Not Guilty or Not Proven. That this was so, was demonstrated, I am informed, by the fact that, immediately after the abolition of the capital sentence for such crimes, the proportion of convictions among the accused showed a sudden great rise.

I think also that it will be acknowledged that the capital sentence for murder is at present having a similar effect. Most of us have known of cases where a criminal, on his trial for murder, has been shown to be a social parasite of the most injurious description, and yet, although it is practically certain that he was the author of the crime, he has not, for one reason or other, been returned as Guilty by the jury. In such cases one cannot but feel sure that had capital punishment been abolished, a conviction would readily have been obtained and society would have benefited thereby.

Then again the direction of attention solely to the crime tends to a corresponding degree to detract attention from the conditions which lead to the crime. Some years ago a woman was hanged in Edinburgh for child-murder. At the investigation it was found that, as is usual in such cases, several other children had almost certainly been murdered by her. In order, however, to get a verdict of guilty, only one murder had to be proved, and the general public heard very little about the other cases. Further, not only was it unnecessary from a legal point of view to consider the other cases, but as some legal friends informed me, it would have been very inexpedient to do so, from a society point of view, for, in the investigations necessary for this, a number of very good people, in the better circles of the town, would have been implicated. Washing dirty linen in public is a process which I would regret to see done quite as

much as my neighbours, but this case illustrates the truth of Quetelet's saying that the crime is the fault of society, and that the criminal is only the instrument. But, moreover, whilst the removal of the instrument has in itself little real ameliorating effect, the judicial means by which this is done are apt directly to have an injurious effect. Keeping out of sight the conditions which lead to such a crime, they tend to make society believe that it is much more moral than it really is, and that there is a wide gap between the criminal and his or her fellow mortals, whilst the gap, if it exists at all, is a very narrow one indeed. Society, therefore, kept by such legal procedures in ignorance of the extent of the immorality which prevails in it, is apt on occasions to try to combat it by means which are unjust and harmful. To my mind there is no doubt that to this ignorance on the part of legislators (at least municipal ones) is to be ascribed much of the harshness and cruelty which is from time to time meted out to that scapegoat of humanity and most pitiable of beings, the prostitute.

All who are to be engaged in criminal law should be trained in the natural sciences, and should acquire a knowledge and experience of individual and social diseases such as can be obtained by courses of instruction in physiology, pathology and medicine, and by clinical instruction in hospitals, asylums and prisons.

Cliniques in prisons have not yet been instituted for any students, but it is interesting to know that in Göttingen, asylum clinical courses have been opened for students of law.

Prison governors should be trained physicians and psychologists, and they should be invested with greater powers as regards the detention or dismissal of criminals. Science indicates that indeterminate sentences would be distinctly beneficial, and that the parole system, so valuable in asylums, should be extended to prisons.

Publicity should be favoured in every way. I need not speak of the value, as against crime, of the telegraph, and of the modern improved and rapid means of transit and communication. Electric lighting will, in many instances, act much better than policemen. As a counteraction to crimes of fraudulent bankruptcy, swindling, etc., publicity as regards incomes, as I understand obtains in Norway, would probably act most beneficially.

Lastly, I would maintain that whatever tends to improve

the education and to promote the employment of women will be of benefit. A better knowledge of the world and of the world's ways will enable women better to shape their course through it, and the lessened degree of dependence on men which will accrue cannot fail to raise the ethical and intellectual standard of male humanity.

In conclusion let me say that I have not attempted to bring before you any specially new facts about crime or criminals. I have not done this, because I wished to draw attention to the big general questions of our subject, and I well know that the risk of the too close investigation of the foliage of a tree is obscuration of its stem and branches. But I think that we have sufficient information to be enabled to deduce some conclusions which will be of practical use.

## 2. TOXICOLOGY IN THE PUNJAB: THE RECORD OF A YEAR'S EXPERIENCE AS CHEMICAL EXAMINER FOR THE PUNJAB

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THE Chemical Examiner of an Indian Province is the official to whom are referred articles in connection with cases of suspicious death from poisoning, violence, abortion, etc., as also in cases of suspected rape, unnatural offences, etc. In addition, all cases of suspected food and liquor adulteration occurring in the province are sent up to him for report ; and he has also a considerable number of commercial and other analyses to conduct in connection with references from the different Civil and Military Departments — Commissariat, Medical, Ordnance, Military and Public Works, Jail, State Railways, etc.— as well as a number from Native States, commercial firms, and private individuals. It is, however, solely with reference to the toxicological section that this paper deals.

In India there is no registration of deaths as the term is understood in Britain. The functions of coroner devolve on the magistrate of the district or town, in consultation with the police and government medical officer (civil surgeon) of the place. When a case of suspicious death occurs, and comes

under the notice of the police, the body is sent to the mortuary, and the civil surgeon performs an autopsy and reports fully to the police on the appearances found, adding his opinion as to the cause of death. If there is no adequate cause—violent or natural—to account for death, and especially if there are any signs pointing to poisoning, the viscera and other articles of importance in connection with the case are despatched by the Civil Surgeon to the Chemical Examiner, and the poison suspected is indicated where there appear to be grounds for forming an opinion on the point.

*The relative prevalence of poisoning* in the different presidencies and provinces, so far as this can be determined by a comparison of the results stated in the Annual Reports of the five Indian Chemical Examiners, may be judged of from the case of the last year, for which (at the time of preparing this paper) all returns were available, viz., 1893. 1621 articles in connection with human poisoning (468 cases, of which 232 were fatal) were examined by the Punjab Chemical Examiner; Bombay Presidency, 1350 articles were analysed in connection with 317 cases; Madras Presidency, 805 articles in 122 cases; Lower Bengal and Assam, 272 articles; North-west and Central Provinces, 247 articles in 122 cases.

*Poisons employed.*—In India, as in other countries, the number of poisons used is comparatively limited. For instance, my Annual Report for 1894 gives 145 cases of arsenic poisoning; opium, 68; datura, 42; Indian hemp, 7; alcohol, 5; mercury, 4—other poisons were detected, but the above-mentioned were those mainly employed. The Indian poisoner is, in the vast majority of cases (like his fellow-criminal elsewhere), a “bungler.” Arsenic is the favourite poison used for homicide; opium is employed mainly for suicide and infanticide; and datura mostly for facilitating robbery. Only the crudest drugs are, as a rule, to be found in native bazaars, and popular knowledge as to the dosage and action of even such a well-known substance as arsenic is extremely vague, and, in consequence, the poisoner’s object may be defeated by the production of free emesis; and, if death occurs, detection is facilitated by the generally more pronounced morbid appearances to be found, as well as by the greater ease with which large quantities of the poison can be identified by chemico-microscopical examination. Vege-

table poisons are very early employed, and the average native's knowledge of the properties of indigenous poisonous plants would appear to be of the most limited nature, if we may judge from the Chemical Examiner's Report.<sup>1</sup> The pathological, symptomatological, and the general facts in connection with the cases referred to in this paper are given as they were furnished to me in the medical and police documents sent up along with each case. Where numbers are incomplete it means that in the other cases referred under that particular heading no information was given on the point under examination.

### ARSENIC CASES

From November 1893 to November 1894—the period with which this paper alone deals—111 such cases were referred to me, and of this number 61 persons died, a mortality of 54 per cent., which is the same percentage as in Europe. Of these 111, 75 were males, 26 females, and in 10 cases the sex was not stated in the official documents forwarded to me, nor were there any means by which the sex of the victim could be determined from the facts recorded in the case. *Viscera, etc., in which Arsenic was detected.*—In the stomach, its contents, and the liver, in 57 instances; in the spleen and kidneys, 12; and in the small and large intestines in 23.<sup>2</sup> *Variety of Arsenic used.*—Arsenious acid (“white arsenic,”  $\text{As}_2\text{O}_3$ ), in 46 cases; orpiment (“yellow arsenic,” “King's yellow,”  $\text{As}_2\text{S}_3$ ), in 6 cases; both white and yellow arsenic (either by sophistication of the white with yellow or by conversion in the viscera of the tri-oxide into the tri-sulphide), in 2 instances; Arsenic (indistinguishable as to the particular salt, *i.e.*, separated by Reinsch's process), in 56 cases. The red sulphide (Realgar,  $\text{As}_2\text{S}_2$ ),

<sup>1</sup> A more detailed account of medico-legal procedure, and of Toxicology, in the Punjab, will be found in “Punjab Poisons,” by Brigade-Surgeon Burton-Brown, M.D. Lond., C.I.E., I.M.S., formerly Principal, Lahore Medical College, and Punjab Chemical Examiner. A copy of this work will be found in the Edinburgh University Library.

<sup>2</sup> In most cases the only viscera forwarded for analysis are the stomach (generally with contents) and portions of the liver. Portions of the spleen, kidneys and intestines are much more rarely sent. Fluids, etc., withdrawn by the stomach pump are occasionally forwarded. In most cases the vomit and feces (or articles or earth stained with them) are sent as well as any suspected articles of food, drink or drugs, as well as cooking vessels or scales, pestles, mortars, etc., which the poisoner is suspected of having employed in preparing the poison for administration.



being difficult to administer on account of its conspicuous colour, is very rarely given : in one case in which white arsenic was proved to have been given I found a mixture of the red and yellow sulphides in the stomach. Thus it will be seen that white arsenic is the favourite salt employed, and this is, of course, due to its tastelessness, odourlessness and colour (blending with the prevailing tint of very many native foods) ; and to the fact that in cooking it undergoes no change except one much to be desired by the poisoner—increased solubility ; the ease with which it can be procured in any bazaar without arousing any suspicion, for there is no Poisons Act in India,<sup>1</sup> and it is employed *domestically* : as a depilatory, cosmetic, parasiticide and vermin killer ; in the treatment of syphilis, sterility, and malaria ; as an aphrodisiac (this is a frequent plea in defence in cases of husband-poisoning) ; by native women internally to make them plump and delicate-skinned (as in Styria) ; as an alternative for opium—for its tonic properties while intermitting the habitual use of opium ; and as a “condition-powder” for horses. *In the arts* in India it is used in making white enamel ; in curing hides ; to prevent timber rotting ; in gold working, etc. It would, no doubt, be a matter of difficulty to restrict the use of a substance so largely employed for legitimate purposes, especially in a semi-civilised community, but what it has been found possible to do in other countries in this respect encourages one to hope that similar restrictions in India may be imposed at no very remote date. *Motives in Arsenic Poisoning.*—Out of the 111 cases, 9 were cases of husband-poisoning, generally in order to facilitate intrigues with other men. In one of these, the husband began to eat his evening meal (cooked by his wife), suffered from gastric pain, and suspecting foul play, gave the rest to his dog, which, with an unfortunate lack of discernment, ate a portion and died. In

<sup>1</sup> The Indian Customs' Returns show that nearly all the white arsenic imported into the country comes from the Persian Gulf and from European ports. This fact, of course, would facilitate restrictive legislation. In my Annual Report to the Punjab Government, 1894, I reiterated the necessity for the adoption of some restrictive measures to control the sale of arsenic and strychnia. It is obviously impossible to restrict, in any efficient manner, the sale of such substances as opium and hemp ; and, of course, datura, aconite, croton, madar, nerium odorum, and most of the vegetable poisons can be had for the gathering in many localities. The question as to how far arsenic restrictions would lead to the employment instead of vegetable poisons, which would be more difficult to detect, has been answered by the experience of other countries.

two other cases it was alleged by the defendants that the object aimed at was aphrodisiasis.<sup>1</sup>

Other motives were : revenge for "slighted love"—in this case a man persuaded a female friend of the woman he was paying court to to poison her food with arsenic. In another case, a native Mission School student, æt. 18, put a large quantity of arsenic in some food to cause death or injury to another youth who had supplanted him in the "affections" of a school-fellow (sodomy). Ten boys were poisoned, of whom four died. The sentence in this case was ten years' imprisonment and a fine of twenty-five rupees,—an easy escape for the heaper of such a holocaust of victims. Another curious case came from the Dharmasala District, where a custom exists of using human ashes as a philtre to subject—for sexual or commercial purposes—the partaker to the giver. Here A, who wished to influence B favourably over a land dispute which there was between them, gave the latter's servant what he stated to be only human ashes (but with which I found minute particles of white arsenic, in lethal amount, mixed) to mix with his master's food ; the plot was discovered before consummation. The minute particles of arsenic looked at first sight remarkably like small calcined bony fragments. In another (fatal) case, a wife was poisoned by her husband's mistress, whom he had brought to live in the same house as the wife. A remarkable case was that in which I found six drachms of orpiment in the stomach of a woman—there were pieces weighing 80 grs., 43 grs., and two of 50 grs. each. The stomach was distended with white flocculent liquid and its mucosa was pale, except for a very small patch of congestion at its pyloric end (death from shock). Arsenic was also detected in the portions of liver forwarded. This woman had evidently, from the post-mortem appearances, been tortured by the native police (with the object of extracting evidence or money from her) by beating on the calves, buttocks, and thighs, and by forcing sticks up the vagina and rectum. The police alleged that the bruising was due to a fall from a ladder ; (the bruising, however, was manifestly caused by beating with the hand or a slipper), but the discovery of arsenic renders the probability very strong for suicidal poisoning in order to escape further torture—the poison being smuggled into the lock-up (where the woman was lying awaiting her trial for theft) by the same means that opium, tobacco and hemp are occasionally smuggled into Indian jails. The police explanation on this point was that, when arrested, she had arsenic and lime in her possession (for use as depilatories) and, as it is alleged that prostitutes use these agents more than "honest women," she poisoned herself in order to escape from such an injurious imputation ! I regret to say that the case was found "not proven" against the police by the very junior magistrate who conducted the investigation. One thing that one never loses sight of in Indian medico-legal work is the possibility of "trumped-up" charges, but there was no reason to suspect anything of the sort here. In another case, a man who wished to poison an enemy treated the whole village to sweets, reserving a poisoned portion for the destined victim. Robbery was

<sup>1</sup> Strabo states that one of the reasons urged by natives of India in favour of "suttee" was that it prevented husband-poisoning, as this involved wife-burning as a sequence.

the motive in three cases—one that of a prostitute, and the other two victims were boys. Abortion was the alleged motive in another case, and four others were suicidal. In the remaining cases the motives were either not stated or could not be stated with any degree of certainty. *Vehicles employed.*—Sweetmeats (sugar and parched grain; “barfi”—a crystallised sweet), 9; in bread and flour, 17; lumps of arsenic thrown into cooking vessels in order that the poison might dissolve in cooking, 6; in “kuchowries” (cake of pulse, fried in “ghee”), 1; in “gulgullas” (small balls of grain-flour, fried in oil), 1; in rice and liver, 1; in mashed pulse, grain and bread, 2; in powder, 7; along with “tabashir” (a siliceous exudation from the bamboo), 2; in sugar (in one case along with “kaur,” a drug like ginger), 4; with vegetables, 2; in flour, ghee and sugar, 1; in well-water, 1; in milk, 2; in various forms of wheat-bread mixed with sugar, butter-milk and ghee, 6; in pill, 2; on brass scales and on pounding-stone, 1; in human ashes, 1; in kabobs (meat roasted in lumps), 1; in meat and bread, 1; in quack medicines, 2; in pulse done up in milk curds, 1; in kidgerree, 1; in pulse, 1.

*Period of on-set of Symptoms.*—(34 cases in which this point is referred to in the documents sent with the case). “Immediately” after swallowing the poison, 3; quarter of an hour after, 4; half an hour after, 5; 1 hour after, 11; within the first eight hours, 9; 13 hours after, 1; 14 hours after, 1. While twenty minutes is generally regarded as the average time of on-set, the on-set is occasionally immediate. Within an hour is the general rule: of the foregoing 34 cases, 23 were within an hour after administration and 11 within the first fourteen hours, or percentage, respectively, of 67·6 and 32·3.

*Interval between on-set of Symptoms and Death.*—(29 records). Within half an hour (from shock), 1;<sup>1</sup> within three hours, 1; 4 hours, 1; 6 hours, 2; 8 hours, 1; 9 hours, 1; 12 hours, 11; 16 hours, 1; 17 hours, 1; 18 hours, 1; 20 hours, 1; 21 hours, 1; 24 hours, 1; within 48 hours, 1; 3 days, 1; 4 days, 1; 8 days, 2; 9 days, 1. The average duration is generally stated as from 18 to 20 hours, and Guy<sup>2</sup> states that 85 per cent. die within 24 hours after administration. In the above cases, 18 died within 12 hours, or 62 per cent.; 6 died between 12-24 hours, or 20 per cent.; *i.e.*, 82 per cent. within 24 hours. Cases are on record in which death has been delayed till the second week; and the longest duration I have noted is 9 days.

*First symptoms.*—Vomiting in 19; burning in mouth, throat, and epigastrium, 9; bitter taste, 3; shivering, 1; faintness, head-

<sup>1</sup> This, so far as I can learn, is the second shortest duration recorded, Thompson’s case (communicated to Taylor) proving fatal in 20 minutes.

<sup>2</sup> Guy’s and Ferrier’s “Forensic Medicine,” 1881, p. 460.

ache, giddiness, sense of throat contraction and burning, nausea, "continuous vomiting and purging," are all noted.

*Nervous symptoms.*—Coma, convulsions, faintness, headache, giddiness, collapse, restlessness, torpor, suppression of urine, paresis of limbs, tingling and burning all over body, are among those recorded. *Conjunctivæ* injected in 8 cases, all of which lived over eight hours. *Silvery furred tongue* was recorded in 8 cases (duration of cases not noted), as well as "blistering" of mouth, mucosa and vivid congestion of tongue.

*Post-mortem signs—Prima via: Stomach.*—Congestion of peritoneal coat, thickening of walls, congestion<sup>1</sup>—diffused, patchy, punctate—with sub-mucous and mucous punctate ecchymoses, rarely excoriations, never perforation. Pylorus often alone congested or most pronouncedly so. In three cases in which death had occurred rapidly from shock, there was an almost entire absence of congestion, the mucosa being pale. In one case in which the small intestines were deeply congested, while the stomach mucosa remained pale, the explanation would appear to be that the irritant so intensified the stomach's peristalsis as to cause it to very rapidly expel on through the pylorus that portion of its contents which had not been vomited. It is probable that from two to three hours is the time required to elapse before signs of marked congestion are shown in the gastric mucosa. Death from shock (before that time had elapsed) would render it possible for death from arsenic poisoning to have occurred without irritative signs in the stomach being found at the autopsy.

*Gastric contents.*—In 32 cases some contents were found, but in only 11 was any solid food found. In 2 cases the stomach was quite empty. The fluid varied in amount up to a quart. In one case (death from shock) the patient had never once vomited, and the stomach contained a large amount of solid food. *Intestines.*—Rectum and duodenum showed most congestion as a rule. Generally the congestion lessens rapidly from the duodenum onwards. The large gut is frequently patchily congested, as was, in a few cases, the small gut as well. Peritoneal congestion rare. Contents of small gut—Small in amount, fluid as a rule, and, in very many cases, mainly consisting of bloody serum. *As to decomposition,* the gastro-intestinal tract is generally well preserved—the stomach most, and the intestines much less; *with these exceptions,* the body generally does not seem to suffer less from putrefaction than in death from other causes. *Liver* congested in 30 cases, and fatty in 3. *Respiratory passages* congested in 5 cases; *lungs* congested (not *post-mortem* congestion) in 26 cases. *Heart* distended in 7 cases—in 3 the right side gorged, left empty. Both sides contracted in 2 cases; both sides empty in 3. Clots (*ante-mortem*) in 7 cases in right heart; in 3 in left; in both, 2. *Pericardium* congested in 1 case. *Endocardial lividity*<sup>2</sup> is noted 7 times—twice in left ventricle about columnæ carneæ. Nothing is

<sup>1</sup> Distinct from ordinary *post-mortem* congestion.

<sup>2</sup> Considered by Tardieu and Bonavia to be a sign of much importance in arsenic poisoning. The stain is quite distinct from ordinary *post-mortem* staining, and cannot, like it, be washed off the endocardial surface.

noted as to the proportion which this lividity bore to the gastric congestion in any of the records sent to me. (It was thought by Tardieu that there was a direct relation between the amount of gastric and endocardial lividity present in arsenic cases.) *Spleen* congested in 16 cases. *Kidneys* congested in 31 cases, congestion of the pyramids being occasionally specially noted. *Bladder* generally empty. *Brain*—In most cases meninges markedly congested: venous congestion of cerebral surface in 5 cases; in 1 case “much bloody serum was found at the base of the brain”; lateral ventricles very frequently noted as containing an abnormally large amount of fluid. Cord membranes noted as congested (not hypostatically) in 3 cases.

*Anomalous Cases.*—(a) 101 grs. of white arsenic found among food in cooking-pot, illustrating the posological ignorance of the average Indian poisoner. (b) Early and rapid suppression of urine. (c) Recovery of a child, three months old, from 12 grs. of arsenic (persistent vomiting and conjunctivæ suffusion lasting six days). (d) An example of the nervous type of arsenic case—man, æt. 30, felt thirsty, giddy, faint, very slight gastric pain, followed by coma, suffused conjunctivæ, no convulsions, *no vomiting or purging*, recovered. (e) Death from shock; no vomiting or purging; died within three hours. (f) “Immediate insensibility” after partaking of poisoned sweetmeats (? syncope from shock); woman recovered. (g) All irritant symptoms occurred except purging (non-fatal case in woman). (h) In another case all symptoms were delayed for fourteen hours after administration (no explanation given, *e.g.*, sleep or admixture of opium with arsenic, etc. (i) Man found dead with scalp wound leading down to fracture of vault, but no signs of vital reaction (therefore injury inflicted immediately before or after death); arsenic in lethal amount was found in stomach, liver, and in portion of small gut.

## OPIMUM

It is mainly used for suicide, either directly or to promote easy death in suicide by drowning, hanging, etc. Infanticide is frequently perpetrated by its means, but adult murder is rare by the agency of opium. (I have notes of 6 cases.) In India the “domestic” or dietetic use of opium often considerably complicates the question as to whether death has been directly caused by the drug or not. Of the 56 cases of which I have notes, 20 are those of females and 32 of males (in four cases the sex

is not stated in the documents forwarded). 40 out of the 56 were suicidal—10 females and 30 males.<sup>1</sup>

*Motives.*—Infanticide, 4 ; murder, 6—husband poisoning by wife and paramour ; old man poisoned by relatives, as he was growing peevish and troublesome to them ; wife-poisoning : husband forcibly administered opium, and then took her to hospital for treatment so as to avert suspicion from himself ; husband, suffering from double pneumonia, poisoned by wife ; man poisoned from motives of revenge, 2 cases. *Onset of Symptoms.*—Immediately, 1 ; in  $1\frac{1}{2}$  hours, 1 ; in 2 hours, 3 ; in  $2\frac{1}{2}$  hours, 1 ; in  $10\frac{1}{2}$  hours, 1. *Interval before Death.*—Rarely mentioned : shortest appears to have been 5 hours ; 8,  $9\frac{1}{2}$ , and 12 hours after administration are also noted. 7-12 hours is the usual fatal period.

*Symptoms in Compound Cases.*—*Opium and croton* : Here the abdominal pain and purging was very great, although seven grains of opium had been given along with the croton. *Aconite and opium.*—Bitter taste, constriction of throat sensation, giddy, vomited thrice, tingling only at nape of neck, gastric pain, twice purged, syncope, great restlessness on recovery from the faint, paresis of limbs, intermittent coma, convulsions, and death. *Post-mortem signs in opium poisoning.*—*Nervous system* : Cerebral meninges—especially pia—generally much congested. Effusion of serum on hemispheres surface. Puncta vasculosa generally greatly increased in number and size. Surplus of fluid in lateral ventricles. *Stomach.*—Out of the 56 cases, in 25 cases, mucosa pale, and in 19 congested—in patches, stellate and punctate, in 6 instances, diffusely in 13. Lesser curvature most affected in 2 cases ; cardiac end in 3 ; pyloric in 1 ; and both orifices in 1. Ulceration on diffusely congested mucosa is noted once (? if connected with the effect of the drug). *Opium smell* in stomach noted in 7 cases. *Peritoneum* congested (especially over large gut) in 1 ; and in another case the small gut's peritoneal coat was most congested. *Small gut's* mucosa congested in 8 instances—in 1 case the duodenal mucosa only. *Empty stomachs* were frequently noted, but these would seem to be accounted for by vomiting (which is more frequently present than is generally supposed) and by the opium not having been taken in relation to a meal. *Liver, spleen and kidneys* congested in 30 cases. *Heart.*—Both sides full of dark, clotted, semi-clotted, or liquid blood, in 6 cases ; right side turgid with fluid or clotted blood, and left side empty in 18 cases. *Pericardial sac* contained from  $\bar{5}j$  to  $\bar{5}ij$  of serum. *Bronchial mucosa and lungs* generally much congested. *Bladder* full in 9 cases ; in 5 cases contained from  $\bar{5}ss$ - $ij$  of urine ; and in 12 cases was empty.

*Motives for Suicide.*—From anger and shame at being sus-

<sup>1</sup> *Ages of the Suicides.*—*Females.*—14 years, 1 ; 18 years, 2 ; 20 years, 2 ; 28 years, 1 ; 40 years, 1. In other 3 cases the ages are not given. *Males.*—13 years, 1 ; 25 years, 2 ; 30 years, 2 ; 34 years, 1 ; 50 years, 1 ; 70 years, 2. (In the other cases no ages stated.) The numbers are too small for any useful deductions.

pected of a theft ; while suffering from pneumonia ; in 3 cases of death by hanging, and in 3 cases where the bodies were found drowned, opium was evidently taken to promote euthanasia ; and, in another case, a married woman committed suicide on finding that she was pregnant by a paramour.

### DATURA

This agent is mainly employed for producing narcosis, in order to facilitate crime.—robbery generally. It is the poison employed by “the poisoning Thugs” (hence called Dhaturias), a fraternity which has succeeded “the strangling Thugs” (or Phausigars), who employed a “rumâl,” or handkerchief, to strangle their victims as they sat at food. In general, natives appear to regard Datura as an intoxicant and narcotic, not as a lethal substance. The dose necessary to induce narcosis is very frequently mistaken, even by professional road-robbers, and the cases of death which occur are generally due to this lack of knowledge, and not to any deliberate intention to kill. The Datura shrub is found growing in most parts of India, and so the poison can easily be obtained by any intending criminal. It has the great advantage for administration of closely resembling one of the commonest condiments used by natives in their food—capsicum seeds. It is almost tasteless. In about half an hour the victim becomes delirious, and then falls into a condition of insensibility, which often lasts a few days, allowing plenty of time for the thieves’ escape. Greatly impaired memory is a common symptom, and this also operates in the thief’s favour, by baffling the efforts of the police to obtain information which might lead to the poisoner’s identification, etc. Another use to which Datura is occasionally put,—according to an account I read some time ago in an old volume of “Travels in India,”—is where unfaithful wives drug their husbands with it, call in the lover, and make the unconscious spouse “cuckold to his face.” Sixty-six cases of Datura poisoning came before me officially in the year under examination—27 males, 19 females, and in 20 cases the sex is not specified. Of this number 10 died (*i.e.* 15 per cent.)—8 males and 2 females. The districts from which the cases were sent were : Lahore, 6 ; Ferozepur, Multan, and Ludhiana, each 4 ; Delhi, Amritsar, Patiala State, each 2 ; and Peshawar,

Dera Ghazi Khan, Gujrat, Rohtak, Mozaffargarh, Leiah, and Sirmur State, each 1. Large cities and densely populated centres, therefore, contributed most cases.

*Age of Victims*—with few exceptions.—Adults, twenty years old, 2 ; thirty, 1 ; thirty-five, 1 ; forty, 2 ; forty-five, 1 ; fifty-five, 1. One case was that of a boy, and another was that in which two girls and both their parents were drugged.

*Vehicles Employed*.—Bread, 5 times ; Dal, 5 ; “gur” (coarse sugar), 4 ; sweets, cooked meat and mushrooms, milk and ghee, each twice ; and in “dahi bara” (dal cakes fried in fat and soaked in milk curds), rice, “khidgere,” curry, cream, in powder, in powdered medicine, “dal mung” (a kind of dal much used by native invalids), in a brown liquid, “panjiri” (a fried mixture of flour, fat and sugar), flour cakes, in “halwa” (pudding of wheat-flour, ghee, and sugar), and along with Indian hemp, each once. Occasionally *Datura* is mixed with tobacco, which is then given to the victim to smoke. In six cases, whole seeds of *Datura* were given ; in the remaining cases, powdered seeds and occasionally finely-divided fragments of the leaves. *Datura fastuosa* and *Datura alba* were the varieties almost universally employed.

*Onset of Symptoms*.—Within quarter of an hour after administration, in 1 case ; in half an hour, 2 ; in three quarters of an hour, 1 ; in one hour, 2 ; in four hours, 1. Half an hour after administration would appear to be the usual period of onset ; but, if a decoction of the seeds has been given, the onset is almost immediate.

*Symptoms—Nervous*.—Great restlessness, in 6 cases ; fainting, in 3 ; insensibility (total), in 13 ; limb paralysis, 3 ; delirium, in 9 ; searching movements (for imaginary objects) of fingers and hands, 4 ; flushed face, 2 ; suffused conjunctivæ, 3 ; stertor, 1 ; “convulsions,” 3 ; temperature, subnormal in one ; 103.2° F. (in axilla) in another ; rigidity of body muscles, arm and leg muscles flexed, muscular tremor and profuse sweating before death were noted in 1 case ; itching, tingling, and burning sensation<sup>1</sup> all over the body, 5 ; intoxication, 7 ; great excitement, 1 ; profound collapse, 1 ; pupils fixed and widely dilated, 11 ; giddiness, 6 ; headache, 2. *Alimentary Symptoms*.—Vomiting, 16 ; purging, 14 ; dryness of throat (which, in one case, a native hospital assistant, struggling after colloquial ease in English, describes in his report as “costiveness of the throat”), 7 ; thirst, 4 ; bitter taste, 2 ; “swelling of abdomen”

<sup>1</sup> This leads the victim in most cases to throw off his clothes in hope of relief. As the clothes are stripped off, the thief collects them and decamps.



(? meteorism), 1. *Circulatory Symptoms*.—Pulse “weak” in 62 cases; imperceptible in 18 cases (10 fatal); quick and full, 20 (some of these overlap, all three occurring at different stages in the same case); veins of neck engorged, 1. *Respiratory*.—Respiration hurried and laboured, 6. *Urinary*.—Suppression of urine, 3. *Death occurred* within four hours of administration in 1 case; within 6 hours, 1; about 24 hours after, 1.

*Post-mortem Signs*.—*Nervous system*: (a) membranes congested; (b) “brain and membranes congested” and 3x of “Serum in ventricles”; (c) “brain congested”: these are the notes recorded in three cases. *Alimentary System*: (a) peritoneal blood vessels injected: no effusion. Stomach dilated, contained 3viii partly digested food, as did also small gut which was “inflamed.” (b) and (c) Stomach contained half digested food: congested in patches. (Both these cases were poisoned at the same time and place and under exactly similar conditions.) (d) Stomach contained partially digested food along with datura seeds (entire). As to the other abdominal viscera, the liver and kidneys are noted as congested in 7 cases and the bladder as being full in 2 cases. *Respiratory System*: (a) mucosa of air-passages congested: (b) and (c) lungs slightly congested at bases. *Heart*: (a) right heart full of dark fluid blood; left heart empty: (b) man, at 55, heart fattily degenerated and both sides contained a medium amount of blood. *Organs, etc., in which datura was detected*. Stomach and contents, 10; small intestines and contents, 3; vomit, 10; motions, 7; on bedclothes’ stain, 1; on pestle and mortar, 1; in cooking utensils and food, 8. *Treatment adopted*: (a) stomach pump and purge; gradual recovery; discharged next day: (b) zinc sulph. as emetic in three cases: (c) enema and stomach-pump: (d) emetics and purges: (e) castor oil alone, in 2 cases: (f) stimulants and quinine: (g) spt. ammon. co. and ether, subcutaneously: (h) castor oil and stimulant mixture.<sup>1</sup>

*Note-worthy Case*.—Here the victim was poisoned by datura given in a mess of mushrooms and cooked meat, and mushroom poisoning was the plea raised in defence. Unfortunately for the prisoner, I found whole seeds of datura in the vomit and in the uneaten remains of the food. Mushrooms, from

<sup>1</sup> In one case a native house-surgeon diagnosed a case of datura poisoning as “congestive apoplexy.” Finding what he considered no distinctive symptoms of poisoning, he proceeded to relieve the symptoms by the stomach-pump; caffein. citr. grs. v and atropine gr.  $\frac{1}{20}$  every two hours; soap and water enemata; and ice to head. The symptoms were: unconsciousness, pupils fixed and moderately dilated; face flushed; conjunctivæ injected; stertor; respirations, 15 p. minute; pulse 62, slow and weak; temp. and skin normal; urine suppressed; trunk muscles rigid, arm and leg muscles flexed; no vomiting or purging. From the point of treatment, the atropine was the only mistake, as, of course, its administration was simply adding fuel to the fire. A purgative (e.g., croton on tongue) to clear the upper part of the gut from seed-fragments would have been advantageous, in addition to the enema which was given.

the spot at which those employed in the case had been collected, were submitted to me for report as to their properties, but were found to be non-poisonous.

*Alcohol.*—I have notes of six cases—two of which were compound. In the four simple cases, congestion of the stomach, liver (alcoholic cirrhosis in one case), brain (cloudiness of arachnoid with large excess of ventricular fluid in two cases), and kidneys was marked. The compound cases were (*a*) alcohol and opium; and (*b*) alcohol and cannabis indica, but there is nothing particularly interesting to refer to in either of them.

*Cannabis Indica.*—Six cases—one mixed hemp and datura. This substance is employed in four forms: (*a*) the dried leaves (“*bhāng*,” pronounced *b’hung*); (*b*) the resinous exudation from the leaves and branches (“*charas*, pronounced *chur’rus*); (*c*) the flowering tops (“*ganja*”); and (*d*) as a sweetmeat (“*majun*,” pronounced *muh’joon*). Many of the cases are simply examples of over-indulgence, but three were cases of drugging to facilitate robbery. In these six references, seventeen people were poisoned but only one death occurred.

In this case the cerebral membranes were much engorged, *puncta vasculosa* very much increased in size and number, great excess of fluid in lateral ventricles; lungs engorged; right heart full of dark fluid blood; stomach congested along lesser curvature and containing a small quantity of greenish liquid (coloured by the *bhāng*); intestines, normal; kidneys congested. The other three people affected in this case were admitted into hospital with vomiting, delirium, deeply suffused conjunctivæ, and on regaining consciousness they complained much of throat-dryness.

In another case seven people were all affected similarly—one hour after eating pulse and wheaten bread (poisoned with hemp, in order to facilitate robbery)—with restlessness, faintness, paresis of limbs, insensibility later, vomiting, purging, slight mydriasis, retention of urine. In another case, a hemp-eater had his spleen ruptured by a blow given during a quarrel, and the assailant, in order to explain away the occurrence more satisfactorily, from his point of view, caused a cart to pass over the body (previously placed in the middle of a road where the deceased was supposed to have been lying intoxicated with hemp). When the medical evidence demonstrated the *post-mortem* nature of the wheel-marks, the prisoner then urged that the spleen was directly ruptured by the use of Indian hemp! The last case was a compound one—*datura* and hemp. Forty-

five minutes after eating a fried mixture of flour, sugar and ghee, the patient became faint, giddy, had headache, paresis of limbs, and then became insensible. ("Costiveness in the throat" again appears in the native doctor's report to enrich our list of symptomatological terms.) Vomiting, purging, and searching movements with the hands are also noted (condition of pupils not referred to). This was a case of drugging to facilitate robbery.

*Mercury.*—Seven cases, of which four were compound, viz., opium, croton and mercury (fatal case of husband poisoning); and in the three remaining, arsenic and mercury (two attempted murder); and the remaining one a case of suicide.

*Croton.*—One simple and the other mercury and croton. Motive in both, attempted murder.

*Aconite.*—Three cases, one of which was of opium and aconite (fatal, and used as abortifacient by a widow illicitly pregnant).

*Chloroform.*—Two suicidal cases (fatal), in which the drug had been swallowed.

*Colchicum.*—One case of accidental poisoning.

*Needle-poisoning.*—The wooden needles exhibited to the Society are very rarely used to poison human beings with, but it is one of the commonest modes of killing cattle criminally. In the only human case of needle-poisoning which was referred to me, the punctured piece of skin from the breast of the woman who was poisoned by this means was sent, and M.X. of the concentrated extract (obtained by Dragendorff's process), when injected into a large lively frog, caused rapid torpidity, total paralysis, and death within quarter of an hour. The case was one of wife-murder, the motive being—as Douglas Jerrold once put it—"to exchange one wife of forty for two at twenty."

I have notes of four cases of splenic rupture, three of drowning, four of strangling, two of suffocation, and three of hanging, as well as many of interest from the point of view of the medico-legal chemist, such as felonious tampering with legal documents, &c., and a large number of references as regards rape, unnatural offences, murder by violence, cattle-poisoning, etc., but these—as well as a description of the analytical processes employed in the detection of poisoning and other cases in the Punjab Chemical Examiner's Laboratory—must be

omitted in order to bring the paper within the prescribed limits for the Transactions. An account of the cases of criminal abortion which were referred to me in the year under examination will be found in the "Edinburgh Obstetrical Society's Transactions for 1895-6."

## Meeting II.—December 2, 1896

Dr WILLIAM CRAIG, *Vice-President, in the Chair*

### I. ELECTION OF MEMBERS

The following gentlemen were elected Ordinary Members of the Society:—F. J. Turnbull, L.R.C.P. and S. Ed., L.D.S., 6 Randolph Place, and George Elder, M.D., F.R.C.P., Ed., 7 Leopold Place.

### II. EXHIBITION OF SPECIMENS

#### 1. *Sir Henry D. Littlejohn* exhibited—

(a) A CASE OF RUPTURE OF A SMALL ANEURISM OF THE AORTA, situated immediately above the valves. The aperture of rupture was small. The pericardium was distended with dark clotted blood. Suspicion was at first attached to the husband, from an injury to the forehead of deceased, believed to have been the result of a blow. Deceased had had some years before fits of an epileptic character. The husband averred that deceased had informed him that afternoon that she had had a fit and had fallen on the floor. Deceased was found dead. The neighbours saw her one hour before this, when she spoke and complained of a feeling of great coldness.

(b) A CASE OF DISSECTING ANEURISM OF THE AORTA, twisting into the pericardium. Deceased lived alone, and was found lying on the floor. She had evidently been dead for at least three days. A laceration existed in the aorta about three inches above the valves, situated transversely, and measuring nearly half an inch. Blood had burrowed from the rupture downwards, and the aperture of exit, which was situated

behind and at the origin of the aorta, was small, barely admitting a quill.

(c) A CASE OF CHOKING FROM THE IMPACTION OF A PIECE OF MUTTON IN THE LARYNX AND ŒSOPHAGUS. The interest of the case attaching to the length (five inches) of the bolus, which extended lower down than usual into the œsophagus.

2. *Mr C. W. Cathcart* exhibited—

(a) SPECIMEN OF SCIRRHUS CANCER OF THE BREAST REMOVED ALONG WITH RECURRENT MELANOTIC SARCOMA OF THE AXILLA AND SIDE. Patient a stout woman of fifty-six. In June of the present year (1896) the patient complained of a small pedunculated wart-like tumour which grew from a pigmented patch of skin near the left posterior superior spine of the ilium. This was ligatured and cut off by her own doctor. On the 26th of July Mr Cathcart removed a melanotic tumour about the size of a hen's egg, which grew in the subcutaneous fat four or five inches in front of the site of the previous tumour. He carried back his incision and took the melanotic patch of skin away at the same time. In October he was consulted on account of a tumour larger than the one removed in July, which was growing near the axillary margin of the breast. From this a chain of small tumours extended almost down to the scar of the July operation. The patient had recently noticed her left nipple much drawn in, and the breast was found to be the seat of scirrhus. On enquiry it was elicited that she had noticed a slight retraction of this nipple for about a year, although she had thought nothing of it until within the last few weeks, when it had altered rapidly.

At the patient's request Mr Cathcart, on the 8th of October, removed the scirrhus along with the secondary melanotic growths, including them in the same incision. Except that one or two small pieces of skin sloughed, which were over-stretched in bringing the edges together, the wound healed rapidly. On the 18th of November she complained of some discomfort below the back part of the scar of the July operation, and on examination some pigmented nodules were found in the subcutaneous tissue there. These apparently were fresh crops from the original melanotic patch which had been removed from this neighbourhood in July. They were not recognisable on the

8th of October when the neighbourhood of the scar was carefully examined in every direction, but there is no reason to doubt that they existed then in very minute form.

(*b*) A LARGE PAROTID TUMOUR, hardened in 30% formalin, and preserved in spirit to illustrate the value of formalin in fixing blood pigment so that the spirit does not afterwards dissolve it out.

(*c*) PORTION OF ANOTHER PAROTID TUMOUR fixed after Torres' method of using formalin (see *British Medical Journal*, July 23, 1896), and mounted as he directs in equal parts of glycerine and water.

(*d*) A PORTION OF THE SAME TUMOUR fixed as before, but mounted in glycerine jelly. The latter method was the best he knew of for preserving the naked eye appearances of tumours. He expressed his indebtedness to Dr T. Shennan for carrying out Torres' directions, and for devising a new way of making large glass cells in which to preserve the glycerine jelly preparations.

### III. ORIGINAL COMMUNICATIONS

#### 1. ON TRADE-LIKE MOVEMENTS FOLLOWING HEAD INJURIES

By ALEXANDER MILES, M.D., F.R.C.S., Edin., Surgeon to Leith Hospital

THE following observations refer to a short series of cases, in which patients, after sustaining severe head injuries, exhibited certain peculiar rhythmical and co-ordinated movements, which, when carefully observed and analysed, turned out to be simply reproductions of the actions habitually gone through by them in the pursuit of their several trades.

*Observation I.*—A strong, muscular young man of twenty, while following his occupation as a plumber, fell from a roof, a height of sixty feet. When seen half an hour after the accident, he was in a very excited state, constantly shouting, and mistaking those around him for his relatives. His words were incoherent, mostly related to his work, and occasionally assumed a lachrymose tone. He had a small scalp wound over the left eye, and there was slight bleeding from the nose and mouth, which was not believed to be associated with basal fracture. Beyond the mental condition, and a persistent devia-

tion of his eyes upwards and to the left, he had no evidence of intra-cranial damage. His right thigh was completely shattered, necessitating amputation.

On being put to bed, an hour and a quarter after the accident, he became restless and even violent. In his delirium he seemed to imagine himself at his work, and he continued to address his fellow-workmen, and to make movements, which one of them voluntarily described as those of beating out lead. The right hand went through short, sharp, hammering movements, while the left was constantly moving about as if smoothing down the lead. He occasionally made evident attempts to grasp some imaginary object in the air. This condition lasted for about eight and a half hours, when it gave place to twitchings, especially of the right arm. Facial twitching was noticed soon after, followed by a slight degree of right facial paralysis. General right-sided twitching soon supervened. He subsequently improved somewhat, and was able to answer questions intelligently and to recognise his brothers. The movements of the arms, however, persisted more or less, and he gradually sank and died seventy-five hours after injury.

The essential points in the *post-mortem* record are the following: (1) there was no fracture of the skull; (2) in the substance of the right occipital lobe, about one and a half inch from its posterior extremity, was an ecchymosis half an inch in diameter; (3) at the posterior extremity of the parietal lobe on the left side was a thin superficial blood effusion on the convolutions and sulci; and slight ecchymosis on the under surface of the left temporo-sphenoidal lobe about its middle; (4) several small petechial hæmorrhages into the grey matter of the right angular gyrus; (5) similar petechiæ in left temporo-sphenoidal lobe; and (6) also into both grey and white matter of the left frontal lobe.

*Observation II.*—T. O., aged twenty-seven, while engaged in carving the front of a building in Edinburgh, fell from a scaffolding a distance of between thirty and forty feet. In his fall the right parieto-occipital part of his head struck a projecting ledge, and he landed doubled-up on his back. When seen within half an hour of the accident he complained of excessive pain in his back, kept continually shouting and talking incoherently, throwing about his arms in a violent manner. He did not recognise those around him whom he ought to have

known, and he addressed others by name as his wife, and as other friends.

There was clinical evidence of a fracture-dislocation of the spine about the level of the ninth dorsal vertebra, as well as two scalp wounds on the right side of the head. There were no localising head symptoms. An hour after admission he became so violent that an 1/80th of a grain of hyoscine was injected hypodermically to quieten him. This it did so speedily and so thoroughly as to cause some alarm, but its effect gradually passed off and left the patient much quieter, although constantly muttering and moving his arms. It was observed that the movements of the arm were distinctly rhythmical and co-ordinated, and they were recognised to be those of a sculptor at work. The left hand was kept firmly clenched and fairly stationary, while the right, also closed, made short, rapid movements as of hammering. This condition was observable for some hours, and then gave place to irregular, restless movements and jerkings.

He regained a sufficient degree of consciousness to express his wants, and even to answer some questions. When asked regarding the accident he described a previous hurt he received at the Forth Bridge, but could give no account of how he came by his present injuries. He died ten days after the accident.

On *post-mortem* examination the cord was found completely torn across by a fracture-dislocation between the eighth and ninth dorsal vertebrae. In addition, the following points may be noted:—(1) there was no fracture of the skull; (2) an extravasation of blood about the size of a horse bean was found in the substance of the right occipital lobe; (3) in the substance of the right angular gyrus were several petechial hæmorrhages; (4) there was a small hæmorrhage into the substance of the right frontal lobe; (5) the cortex at the lower end of the right Rolandic area was blood stained; (6) thin superficial clots were found over the posterior part of both occipital lobes; (7) small surface hæmorrhages were found on both sides of the pons, left side of medulla and restiform body; and a small extravasation into the posterior part of the optic thalamus.

*Observation III.*—A third patient, who fortunately survived his injuries, also presented similar features of interest. While standing on a ladder painting a sign-board he fell to the ground and sustained severe head injuries. When still in a semi-



sensible condition he continued for long periods to paint imaginary signs on a screen beside his bed, steadying the right hand, with which he made fine up and down movements on the opposite forearm. This was the more interesting as he was for a considerable time after the injury absolutely blind—a point I shall take occasion to refer to at another time.

*Remarks.*—The outstanding clinical feature common to this small group of cases—the trade-like movements supervening early after a severe head injury—is one of some pathological as well as clinical interest. So far as I have been able to gather, such phenomena have not often been observed. The only definite statement I have found was made by Callendar in 1867. He says:—“I recollect a patient, æt. fifty-three, who had fallen thirty feet through a trap-door, and who suffered from concussion, with restlessness. He had eventually, whilst yet insensible, to be strapped to his bed to prevent him from leaving it, as he had repeatedly done for the sole purpose of pacing to and fro across the ward, as though he were pursuing some ordinary occupation. He was night-watchman in a warehouse. Again, a sailor from one of the river steam-boats, aged forty-three, was supposed to be suffering from convulsive movements affecting the upper extremities and associated with concussion; but one of his friends, as soon as he saw him, explained that he was only busy steering his boat. When he came out of the concussion he ceased to be busy with his hands.”

In attempting to explain these cases it is probably impossible to dissociate the particular symptom under discussion from the other clinical phenomena exhibited by the patients. Any explanation which meets the more commonly observed symptoms will doubtless be sufficient to account for these peculiar movements also.

We have first to consider if in these cases there was an association, as cause and consequence, between the gross pathological lesions and the clinical phenomena.

If we find it so, the next question raised will be whether each lesion was to be accredited with producing its own definite reaction, while the uninjured parts of the brain continued to act normally; or whether the whole function of cerebration was deranged and the focal lesions simply determined the directions in which this derangement should become manifested.

On comparing the clinical symptoms with the morbid anatomy of the two fatal cases, a striking parallelism becomes apparent. Both patients, at first, were in a state of violent excitement, constantly shouting and talking incoherently. Both were unable to recognise their friends and fellow-workmen, and persisted in addressing strangers by the names of their intimates. Each performed in a marked manner the movements appropriate to his trade, and in both cases, after a varying period, these signs passed off, and the patients became rational. Although both subsequently died, in neither case was death due to compression or to septic infection of the brain.

The *post-mortem* appearances in the two cases were also strikingly similar. In each (1) the interior of the right occipital lobe was the seat of a small vascular lesion; (2) several small petechial hæmorrhages had taken place into the grey matter of the angular gyrus; (3) on the surface of the motor areas there were thin sub-arachnoid clots; and (4) the substance of the frontal lobes (in the first case the left, and in the second the right) was the seat of petechial extravasations. In addition, in the first case, small effusions were found in the substance of the left temporo-sphenoidal lobe.

This close resemblance between the two cases indicates, I think, that the gross damage to the brain and the clinical signs were causally related, and although the evidence is not of such a nature as to be of positive value in cerebral localisation, it is sufficiently distinct to negative the idea of mere coincidence.

As to whether each naked eye lesion found may have attributed to it one or other of the clinical symptoms, I am doubtful. I do not believe that any one of the observed lesions occurring alone in an otherwise healthy brain would have given rise to any clinical signs at all. It is true that Hughlings Jackson has pointed out that failure to recognise objects, what he terms *imperception*, is especially characteristic of lesions in the right occipital lobe. In both of these patients such a lesion existed, but it will be noted that they did not fail to recognise those around them *as objects*, but simply mistook their identity. This error might be traced to the existing cortical lesions in the angular gyrus, which, according to Munk, prevent (in dogs at least) the recognition of objects *by sight*, although they may still be recognised by other senses.

Against this explanation, however, we have to place the fact that these patients failed to recognise the *voices* of their near friends, as well as their features.

It appears to me that the view that the whole cerebral function was disordered, and that the grosser lesions simply determined the particular lines in which this should be manifested, is the more satisfactory.

I suppose there can be little doubt that the delirium of the first few hours was to be attributed to the anæmic condition of the brain, resulting from the concussion.

This initial anæmia, accompanied and followed by localised effusions of blood, with resulting interference with vascular and lymphatic circulation, and inflammatory reaction, would so far affect the nutrition of the nerve cells as to leave them in an unstable condition, and ready to respond to much milder stimuli than when in their normal state. It is no more than we should expect that the cells which most constantly and automatically discharge nerve energy should most readily respond to such slight stimuli. That bilateral movements followed a one-sided lesion is no objection to this explanation, because we know that actions habitually performed by both limbs synchronously, are represented on both sides of the brain. On lines such as these I would venture to suggest an explanation of the trade-like movements.

The other clinical phenomena exhibited by the patients, such as failure to recognise friends, misnaming those around them, etc., are doubtless explicable on similar principles. The region of the angular gyrus appears to be that in which the higher visual centre is placed, where the two retinal images are combined and interpreted. In the cases under discussion it may be that the slight lesions in the angular gyrus caused a perversion of the impressions received from the lower (occipital) centre, where they had already been imperfectly registered, on account of the lesions there.

The unstable condition of the nerve cells in the visual centres and parts functionally associated with them, resulting from the interference with their nutrition, was manifested, just as in the motor parts of the cortex, by their acting in the way they were most accustomed to act, namely, in the recognition and naming, by the patient, of those most intimately and most constantly associated with him.

## 2. ON APPARENT REDUPLICATION OF THE SECOND SOUND IN MITRAL STENOSIS

By FRANCIS D. BOYD, M.D., F.R.C.P., Ed., Clinical Medicine Tutor,  
Royal Infirmary, Edinburgh

THERE are few problems in the auscultation of the heart which have given rise to more controversy and are more difficult of explanation than anomalies in reduplication of the second sound. One of the most puzzling of those, and one which has given rise to most controversy, is a reduplication of the second sound audible at the apex, while a single second sound may be audible at the base at the aortic and pulmonary areas. That this condition is fairly common in mitral stenosis there can be no doubt, there is never a session passes but one, and sometimes two, examples of the phenomena come under my notice in the clinical tutorial work at the Royal Infirmary. For example, Mrs K——, under treatment in the wards of the Royal Infirmary, suffering from mitral stenosis consequent upon an attack of rheumatic fever. On examination of the heart, the apex was found one inch external to the mammary line. There was a well-marked presystolic thrill. On auscultating over the apex a loud presystolic murmur was audible, ending in an impure first sound, and followed by what appeared to be a very loud double second sound with a very distinct interval between its two elements. At the tricuspid area a soft blowing systolic murmur was audible, the second sound was accentuated and single. On passing upwards from the apex to the pulmonary area the reduplication of the second sound diminished in distinctness, till at the third interspace it was completely lost, a single second sound being alone audible. The second sound at the aortic area was clear and single.

The first problem which arises in the consideration of such a case seems to be,—Are we here dealing with a real or an apparent reduplication of the second sound, *i.e.*, are there two individual second sounds audible, or is one of the elements of the double sound a superadded sound not produced at the aortic or pulmonary orifices? Against the possibility of the reduplication being real and due to asynchronous closure and tension of the aortic and pulmonary valve cusps, the objections seem very strong indeed. The area of audition seems at once to negative such a view. The apparent doubling was best

heard, in the case quoted, at the apex, and was not at all audible at the base. Even granting that asynchronous closure and tension of the aortic and pulmonary valve flaps may take place without any reduplication being heard at the aortic area, I know of no condition where asynchronous closure and tension occurs without a reduplication being audible at the pulmonary area. As Ewart (*Lancet*, October 6th, 1894, p. 790) has shown, the anatomical and physiological facilities for the conduction of the aortic second sound are very great. Even in mitral incompetence, where the aortic second sound may be markedly weakened, asynchronous tension of the two valve flaps will give rise to a reduplication audible at the pulmonary area.

If then, the doubling of the second sound at the apex is apparent and not real, how is it to be explained? Many theories have been advanced. Sansom thinks (*Lancet*, Sept. 1894, p. 730) that the reduplication is apparent, not real. The tension of the mitral curtains being affected early in diastole, the moment the ventricle becomes relaxed after its systole, the blood retained in a state of tension (the pressure in the pulmonary circuit being heightened) in the left auricle, enters with force into the ventricular cavity, and finding its way on to the parietal side of the curtains of the mitral valve, causes these to bulge towards the centre of the ventricle, and in so doing, causes the click of valve tension, which click coming so soon after this second sound closely resembles a reduplication of the latter. The objections to this theory seem weighty. It is difficult to imagine the fibrous and inelastic valve flaps met with in cases of mitral stenosis being put sufficiently on the stretch to produce the click of valve tension by the blood passing through the mitral orifice during ventricular diastole. And it is the more difficult to imagine if we remember that, as must be the case, there is blood pressing on both sides of the valve flaps. If the blood were passing through the mitral orifice during diastole, under sufficient pressure to enable a reflux stream to press on the valve flaps and so produce the click of valve tension, would not mitral diastolic murmur be inevitably present? Dr Sansom's explanation is ingenious, but I do not think it can be accepted.

Again, the reduplication has been ascribed to asynchronous closure and tension of the individual semilunar cusps, but the great objection to this view seems to be that it is almost

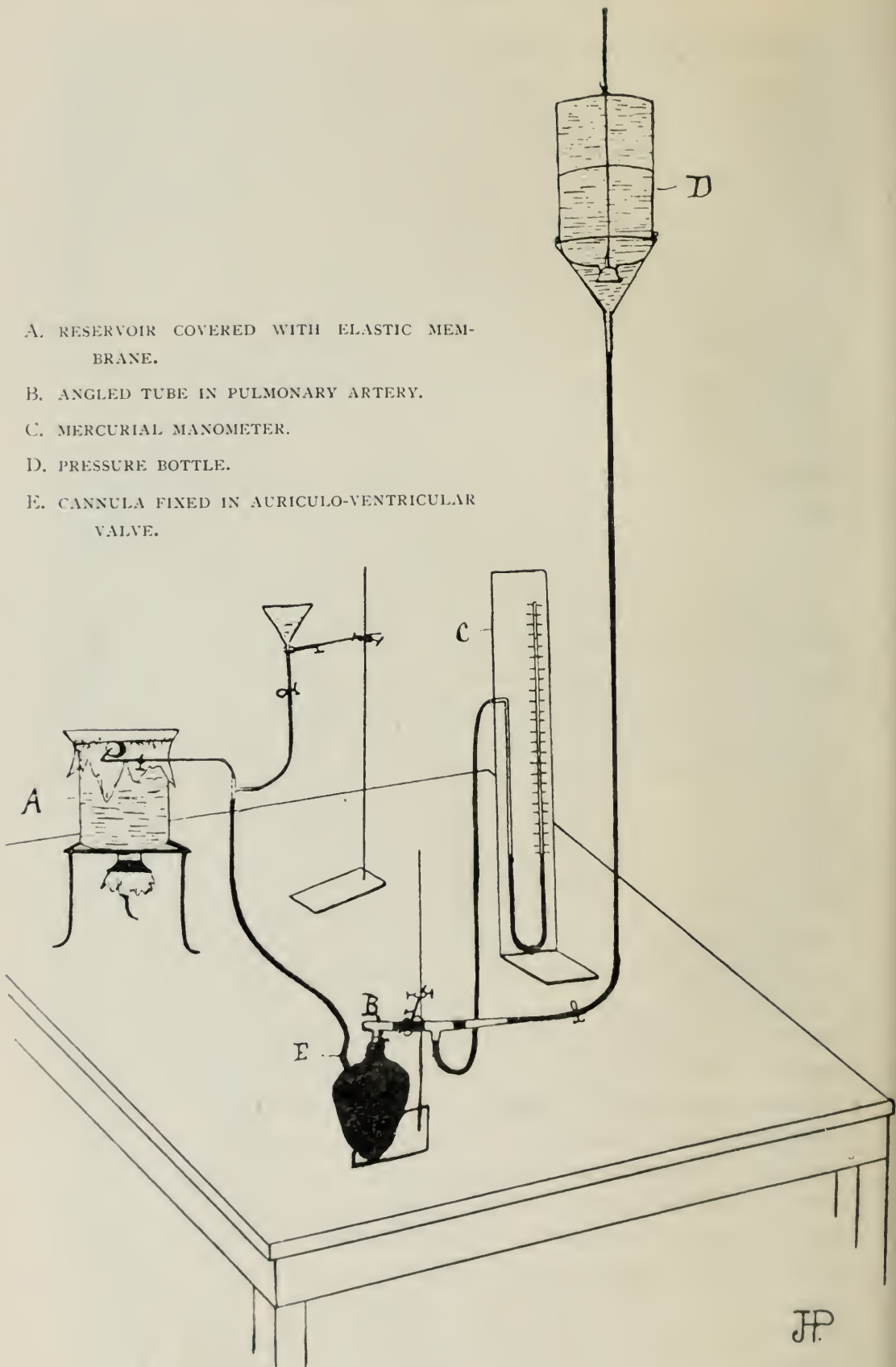
impossible to conceive this asynchronism without the development of a murmur of incompetence.

Dr George Balfour (*Clinical Lectures on Diseases of the Heart*, 2nd edition, p. 33; *Lancet*, March 5, 1881, p. 396), has advanced the view that the first element in the reduplication is the audible snap which attends the systolic closure of the semilunar valve segments separated by an appreciable interval from the diastolic snap, the result of tension following the arterial systole. This view is based upon the observations of Ceradini (*Der Mechanismus der halbmondförmigen Herzklappen*, Leipzig, 1892, p. 62). Working at the method of closure of the semilunar valves, Ceradini constructed an apparatus by means of which he could study the closure of the valves in the isolated conus arteriosus and right ventricle. He found that the moment the pressure within the pulmonary artery equalised the pressure within the ventricle the valve flaps fell together. There can be no doubt, therefore, he states, that the commencement of the short or second sound of the heart is synchronous with the end of the ventricular systole and in the following commencement of the diastole only becomes more intensified. Certain it is, he states, that when one lays the finger on the sinus arteriosus a distinct shock can be felt on the falling together of the flaps, and in listening, an indubitable tone is perceptible.

If we accept these observations of Ceradini we at the same time allow the possibility of mere closure, without valve tension, producing an audible sound. His conclusion that the second sound is systolic in time has been attacked, and for my part I think controverted, by Sandborg and Worm Muller (Pflüger's "Archives," Vol. XXII., 1880, p. 417). In their work they used the entire heart and constructed an apparatus which fairly well represented the circulation, and in which a regular circulation could be kept up. Without going into unnecessary detail, they found that the instant the pressure under the semilunar valves is removed and the pressure in the aorta gets the upper hand, the blood in the aorta is set in movement in the direction of the apex of the heart. This movement ends with the closure of semilunar valves. The part of the blood which lies between the semilunar valves in their separated position will find its way back unhindered into the ventricle, while the more peripheral part of the blood will come

up against the sac-like semilunar valves, and will be hindered in its further course. There thus exists a difference in the pressure on the two sides of the valves, the free ends of the valves come together and the mouth of the artery is closed. The closure of the valves is thus caused by a backward movement of the blood in the lowest part of the artery, and is diastolic in time. Fiedering ("Centr. für Physiol.," Bd. VI., No. 9, July 1892), working with a cannula in the aorta and ventricle of live rabbits, also found the closure of the valves to be diastolic in time. Working in the laboratory of the *Royal College of Physicians of Edinburgh* I constructed an apparatus on somewhat similar lines to that used by Ceradini. Sheep's hearts were used in the experiments. A large vessel, the reservoir (see diagram), was covered with a strong elastic membrane; by sharply depressing this membrane with the hand the pressure in the reservoir could be suddenly raised. From the reservoir a tube led which ended in a cannula (protected with india-rubber tubing), which was inserted into the auriculo-ventricular orifice, and firmly fixed. In the tube leading from the reservoir to the cannula a  $\Gamma$  tube was inserted, the cross limb of which led to a funnel fixed above the height of the reservoir, and thus the reservoir could be filled. In the pulmonary artery an angled tube was inserted and tied, through the cross limb of which the closure of the semilunar valves could be watched. The angled tube was connected with a pressure bottle, and in the tube between the two a mercurial manometer was inserted. Clamps were fixed at necessary points. The ventricular systole was accomplished either by sudden pressure upon the elastic membrane of the reservoir, or by compressing the ventricle with the hand. The closure of the valves was observed through the angle of the tube, while auscultation was carried out with a binaural stethoscope and the phonendoscope. The observations were repeated on six different hearts. When working with the stethoscope I found that in order to produce a perceptible sound on the closure of the valves it was necessary to raise the pressure in the pulmonary artery to between 20 and 30 mm. mercury. If the ventricle contracted when the pressure in the pulmonary artery was below 20 to 30 mm. mercury, the closure of the valves was inaudible. When working with the phonendoscope, however, it was possible to hear a faint sound at a much lower pressure, in fact, a *faint* sound was

- A. RESERVOIR COVERED WITH ELASTIC MEMBRANE.
- B. ANGLED TUBE IN PULMONARY ARTERY.
- C. MERCURIAL MANOMETER.
- D. PRESSURE BOTTLE.
- E. CANNULA FIXED IN AURICULO-VENTRICULAR VALVE.





audible when the valve closed under the mere weight of the column of water in the six inches of wide tube representing the pulmonary artery. If, however, the diastolic relaxation was carried out slowly the valves could be seen to close, and the closure was *absolutely inaudible*. From this it must be concluded that mere closure without a certain amount of tension will not produce an audible sound.

In cases of mitral stenosis there is a marked increase in the pressure within the pulmonary circuit,—there is a damming back of the blood at the mitral orifice. In the so-called reduplication under discussion, the first element is of considerably greater intensity—considerably more accentuated—than in health, and it seems impossible to account for it by the mere falling together of the valve flaps on the equalising of the pressure on the two sides of the valve.

The following case seems to throw some light on the condition :—

J. K., aged 27, was admitted to the wards of the Royal Infirmary suffering from shortness of breath, which had lasted about a year. There was no history of rheumatism. His illness had begun about a year before admission with a severe cold. He had cough and expectoration, and was confined to bed for five weeks. He returned to his work, though not feeling well. The difficulty in breathing increased, and necessitated him seeking advice at the Infirmary.

A pale, slightly-built man, he exhibited no dyspnoea while at rest, but dyspnoea became marked on the slightest exertion. There was no cyanosis. The precordia was normal in shape. The apex beat was visible in the sixth interspace in the mammary line. The cardiac pulsation was diffused, extending to the left border of the sternum. No thrill was present. The absolute cardiac dulness was normal. The relative cardiac dulness on the left side extended one inch to the left of the mammary line, on the right side the dulness extended two inches to the right of the midsternal line. On auscultation in the mitral area a loud presystolic murmur was audible, ending in a loud, sharp, pure first sound. The murmur was followed by an apparently distinct and loud reduplication of the second sound, the two elements of the reduplication being separated by a very appreciable interval. The murmur and the cardiac sounds might be imitated by the sound “*rrup-*

*ti-ti*. No reduplication of the second sound was audible at the base, only a single accentuated second sound at the pulmonary area, and an apparently normal second sound at the aortic area. On the following day the auscultating signs had altered. The presystolic murmur and first sound were audible as before. Following the first sound came an accentuated second sound and then a short murmur. The second element of what had appeared a reduplication of the second sound had become lengthened out and transformed into a murmur, diastolic in time, and produced at the mitral orifice. From the distinct and well-recognised *rrup-ti-ti*, the sound had changed into *rrup-ti-ēē*, the final *ēē* having a slightly blowing character. The second sound at the pulmonary area was markedly accentuated but single, the aortic second seemed about normal in quantity.

The explanation of the alteration in the auscultatory phenomena seems to be as follows:—There was marked mitral stenosis present. When first examined, the ventricular wall was exhausted, and the negative pressure within the ventricle was slight. There was then audible at the apex a loud second sound followed by a sound which closely resembled a second sound, but was really produced by the blood passing through the stenosed mitral orifice during the early part of ventricular diastole. On the following day the exhausted heart had considerably recovered by the rest of twenty-four hours in the recumbent posture, the ventricles were stronger, and the negative pressure within the left ventricle during diastole was greater. In this way, the blood, being sucked through the stenosed mitral valve under greater pressure during the ventricular diastole, instead of producing an indefinite sound, produced a distinct murmur.

That the second element in an apparent reduplication may be transformed into a diastolic murmur is no new observation, for Guttman draws attention to the fact in his "Hand-book of Physical Diagnosis." The condition, however, is rare, and seems to throw some light on the apparent reduplication in some cases.

In conclusion, I would urge that when a reduplication is heard at the apex and not at the base it is an apparent, not an actual, reduplication of the second sound, and that the second element is produced at the mitral orifice, and may be actually a diastolic murmur.

## Meeting III.—December 16, 1896

DR ARGYLL ROBERTSON, *President, in the Chair*

## I. EXHIBITION OF PATIENTS

1. *Prof. Sir T. Grainger Stewart* exhibited TWO CASES ILLUSTRATIVE OF THE USE OF ERYSIPELAS ANTITOXIN. The treatment had been adopted on the suggestion of Dr Gibson, and in one case it had proved distinctly of value.

(a) J. C., æt. 25. Worker in a brass foundry. Complained of persistent swelling of the eyelids and upper part of cheeks, with recurring attacks of redness, heat, and itchiness.

The conditions apparently began in an attack of erysipelas of the cheeks twelve years ago.

Erysipelatous attacks have recurred at intervals, varying from three to nine months. The parts affected became more and more swollen, and the swelling, though somewhat less in the intervals, never completely disappeared.

She has been troubled with discharge from her nose and fissures around the anterior nares during the last three months, but seeing that that was of recent occurrence, it could not be regarded as a cause of the cutaneous change.

When admitted, the eyelids and the subjacent parts of the cheeks were swollen and œdematous looking, but they did not pit on pressure. The palpebral fissures were more than half closed. The parts were slightly red.

The condition was diagnosed as recurrent erysipelatous lymphangitis.

It was decided to try injections of erysipelatous antitoxin. This was begun in small doses, viz., 0.2 c.c. The dose was gradually increased up to 1 c.c.; the temperature and other signs of reaction becoming more and more manifest. Slightly smaller doses were then given on two subsequent occasions with even more marked reactions, the temperature rising to 104.4° F., accompanied by rigor, pain in the joints, and much pain and swelling at the seat of inoculation. Also by redness and swelling about the cheeks and eyelids.

The condition improved from the first, and the patient was discharged practically cured, though the right palpebral aperture remained slightly less than the left.

(b) M. C., æt. 16. Of no occupation. She was affected with a very similar condition to the last case, only in a more severe form. Here the palpebral fissures were all but completely closed, and the patient could hardly see to walk about.

The disease had been in existence eleven years; it also originated in an attack of erysipelas.

The erysipelatous attacks had recurred from time to time, and the parts had gradually become more swollen.

There is no history in this case of discharge from the ears, but the condition is complicated by the presence of numerous suppurating tubercular glands in the right side of the neck.

The patient is markedly strumous.

The diagnosis being the same as in the last case, the same treatment was adopted, but with very slight result, both as regards reaction to the antitoxin and improvement of the condition.

The temperature on one occasion, when 0·6 c.c. had been injected, rose to 100·3° F. The dose was increased to 1·3 c.c.; this last produced no general reaction at all.

The patient left hospital somewhat improved, but with the palpebral fissures barely half open.

Notwithstanding the disappointment in regard to the second case, Sir Thomas thought the treatment worthy of further trial.

(c) A CASE OF A HITHERTO UNDESCRIBED FORM OF SKIN DISEASE.

R. F., æt. 18. A groom. Was admitted to the Royal Infirmary complaining of a widespread, painless skin eruption.

The disease began, about two years ago, as a small growth on the right hip; it was followed by a similar one on the left side of the nose. For twelve months the growths appeared one after another on various parts of the body. The disease then became all but stationary.

The eruption is distributed over the scalp, face, trunk, arms, and legs above the knees. On the face the growths are numerous but small. On the hips and buttocks they are much larger. Over the rest of the body they are more scantily distributed. They involve the cutis and cutis vera.

The eruption begins as small reddish spots, with a central dilated vessel, from which the blood can only be partially removed by pressure.

Each spot gradually rises above the surface and becomes a nodule, and changes from a red to a bluish purple colour. In some situations, *e.g.*, on the hands they assume a warty character, but most of them appear to undergo some fibrous thickening in their walls.

On the face they don't exceed a pea in size, but on the buttocks some are as large as small cherries.

When injured they bleed freely, and one or two of them have subsequently healed, leaving puckered cicatrices. Two growths were removed and subjected to microscopic examination, and found to consist chiefly of angiomatic tissue, with fibrous thickening of the walls and stroma.

Most of the growths might be called angiofibromata, while some of those on the hands are more like the disease known as angiokeratoma. Sir Thomas preferred simply to call it an angioma.

The treatment adopted was electrolysis, and so far as it has been tried the results have been most satisfactory.

2. *Dr Argyll Robertson* exhibited a young man, 25 years of age, from whose right eye he had extracted the lens on account of a high degree of MYOPIA. The lad had suffered from ulceration of the cornea when about 5 or 6 years old, and some fine nebulous opacities of the cornea still remained, especially in the right eye. He had never worn spectacles, and had always used his left eye while reading or looking at anything attentively, the right eye becoming diverged. In the right eye the myopia amounted to 18 D and his acuteness of vision was  $\frac{6}{36}$ . In the left, the myopia was 14 D and vision  $\frac{5}{15}$ . While reading he had to hold the book as near as  $4\frac{1}{2}$  inches. The right being the worse eye, and one that was of little practical utility to him, was alone subjected to operation. The operation consisted in breaking up the lens with a needle and subsequently extracting the fragments. As a result, complete correction of the myopia was obtained, and he has now, without any glass, better distant vision in that eye (almost  $\frac{5}{20}$ ) than he had before with the use of the most suitable lens that could be adapted. On placing a moderate convex lens (+ 3 D) before the eye he can also see to read ordinary print with that eye with ease.

He now uses his right eye for distant vision and his left

for reading, and thus brings both eyes into use, and can manage very well for ordinary purposes without glasses. As a result of the right eye being brought into use, some further improvement may yet be hoped for.

3. *Dr John Thomson* exhibited a well-marked case of SPORADIC CRETINISM in a girl-baby aged 15 months. She had been treated for three weeks with the colloid matter separated from sheep's thyroids by *Dr Robert Hutchison's* method, and sold under the name of "Thyrocol." This preparation had proved itself extremely active. One-sixth of a grain given daily had caused a noticeable improvement within three days. The dose had been gradually increased, until  $\frac{2}{3}$  gr. was given daily. This had caused too much reaction, and she was now having  $\frac{1}{2}$  gr. The improvement was already very great.

4. *Dr Alex. James* exhibited two cases, both presenting marked MUSCULAR TREMORS, which were, he believed, malarial in origin.

(a) The first was a man aged 39, who was now employed in the Post Office, Edinburgh, but who had been a soldier in India for several years, and had there suffered from malaria and dysentery. He had left the army in 1883, and had remained in good health until his present illness. This begun in August last, when, as the result of a chill, he had an attack of diarrhoea. On his recovering from this, he began to notice great general weakness, pain in the back, and tremblings in the muscles of the arms and legs. These tremblings have continued. They seem to become more marked when the patient is being watched, or when he becomes excited, or when any voluntary act is attempted. They also occur both in arms and legs when the patient is lying still in bed. The voluntary motor power is markedly impaired, the muscles are much wasted, and are somewhat tender on pressure. There are no sensory disturbances, and the superficial and deep reflexes are all somewhat exaggerated. He has noticed an occasional slight difficulty in starting the act of micturition.

(b) The second case was that of a man aged 48, a sailor by occupation. He had never suffered from malaria, but trading along the West Coast of Africa, he had often been for

long in malarial regions. He had had an illness of the same nature as his present one nine months ago, but had so far recovered as to be able to resume his work. Three weeks ago, as the result of exposure, his symptoms had all returned. In this case also the prominent symptoms were, great general weakness, pain in the back, slight bladder trouble, and tremors in the muscles. There was considerable muscular wasting and tenderness, and there was also some numbness in the hands and feet, with slight impairment of tactile sensibility. The superficial and deep reflexes were all increased.

Both those patients were showing marked improvement as the result of the administration of quinine, but in neither of them was there any enlargement of the spleen, or any other distinct symptom of ague.

5. *Dr Allan Jamieson* exhibited—

(a) CASES OF LUPUS treated with a new remedy.

When Dr Unna was in Edinburgh in last July, he mentioned that he had been very successful in some cases of lupus vulgaris, by treating them with Liq. Antimonii chloridi. He gave me then no particulars of the mode of using this, but Dr Norman Walker kindly informed me that it was painted on the patches daily, much as carbolic acid. The remedy was not an entirely new one to me, though not for the purpose suggested by Unna. It has long been employed in the treatment of foot-rot in sheep, a disease in which the hoofs become unhealthy, suppurate and fungate, and I have both seen it used with good effect in Australia, and have myself applied it, in this disease. In lupus it has been swabbed on freely, usually at intervals of a week, as it forms a dry crust, which has been allowed to separate before a fresh application is made. The pain is sharp for a few minutes, but soon completely subsides. It has been found necessary, in order to obtain a sufficient degree of penetration, either to open up the patch by the employment of Unna's salicylic and creasote plaster muslin for two or three days, or by poulticing with starch poultices. In one case of the florid and diffuse type, on the face, it occasioned severe pain, and the cheek became red, hot, and swollen, requiring to be dusted to cool it. Great improvement follows its use, but it seems to produce a degree of condensation of the tissues, favouring encapsulation of the lupus nodules, as while

some wholly disappear, others resist, and remain as isolated dots.

(1) M. T., 13, Dundee. Admitted to Ward 38 on 13th August 1896. The peculiarity in her case was the number and symmetry of the lesions, and the tendency to the formation of common warts on the hands, the cropping up of a ring of warts round some patches of lupus which had spontaneously vanished, leaving a smooth, white scar, and the development of lupus verrucosus on the hands, wrists, and feet. The disease began, she says, seven years ago on the right toe. There are now patches on the cheeks, fingers, wrists, forearms, elbows, knees, ankles, feet, and nates. Most of these have very greatly improved, under the alternate use of salicylic and creasote plaster muslin and liq. antimonii chloridi. They have flattened, become softer, and the nodules are in most places discrete, but the disease is not cured. She has probably tuberculosis of the lung, though no bacilli found. She came first to Dr Walker as an out-patient on Wednesday. He had a drawing made of her condition, which he has kindly offered to show. This will better than anything show the alteration effected.

(2) M. M'P., 10, Edinburgh. Lupus of cheek, neck, and under chin for five years. That on the cheek was scraped by Dr Walker in August. When healed she was admitted to Ward 38 in October, and has been treated with the liq. antimonii chloridi at intervals since. The lupus has become quite pale, though there are still some minute, isolated nodules present.

(3) M. J. C., 12, Liberton. Had first tubercular disease of phalanges of index finger, and part of metacarpel bone, and when seen in summer there was still a sinus. Under treatment with salicylic and creasote plaster muslin, this cicatrised. The application of the liq. antimonii chloridi was then commenced, and now there is little if any disease remaining.

(4) J. G., 17, Edinburgh. Disease commenced in neck near angle of jaw, by inflammation and suppuration of gland, this burst, and in the resulting ulcer lupus developed. This was at first treated with a 10 per cent. pyrogallic ointment, latterly by painting with liq. antimonii chloridi, and also by boring into the residual nodules with a point armed with the same.

(5) J. M'N., 16, Armadale. Received a blow from a stone on the left cheek more than five years since. On the site of



the injury lupus developed, was followed by enlargement and suppuration of a cervical gland, and extension to that locality. On admission three weeks ago the patches were freely scraped, cauterised with solid silver nitrate, and when healed painted as the others, twice. The reaction was considerable, resembling erysipelas. The case is one of the florid and diffuse type, but the improvement is marked.

(b) CASE OF RAYNAUD'S DISEASE.

E. B., 13, Edinburgh. She has marked tubercular history on mother's side. Had scarlet fever when six years old, and thinks present condition developed subsequently. The hands and feet are nearly always cold and clammy, and of a livid hue, most marked over the joints. This lividity extends some way up the forearm. There are firm, flat tubercles on the articulations especially, with an indolent ulcer on each. The diet seems to have been judicious. Under the application of a zinc gelatine, the ulcers have healed, while the circulation has improved under the administration of one one-hundredth of a grain of trinitrine twice a day.

6. *Dr Norman Walker* exhibited—

(a) A BOY AND A CAT WITH ALOPECIA. The boy was brought to the Infirmary with a patch the size of a shilling on the front of the head. The hair was very thin, but there were no evident short broken hairs characteristic of ringworm, nor had it the scaly appearance characteristic of a recently developed patch. The boy's grandmother supposed it was ringworm, but could not conceive, she said, how the boy had got it, as he never mixed with other children. Inquiry, however, disclosed that the domestic cat was suffering from a bald patch on the leg, and the cat was brought the following week. A large area on the inside of the left thigh showed many similar changes to that of the boy. There was no actual baldness, but the hair was very much thinned. The most careful examination of hairs from both patients failed to discover any of the fungus of ringworm, and *Dr Walker* intended now to destroy the cat and examine the skin histologically.

(b) A PATIENT WITH ICHTHYOSIS. The patient, a boy, aged 18, was said to have suffered from earliest infancy, it being noted in the first month of his existence that he was constantly dirty, and had to be washed more often than most

infants. It was a well-marked example of the milder form of this disease. The patient has been ordered thyroid tabloids, which had an undoubtedly beneficial effect in this disease.

(c) A CASE OF LUPUS ERYTHEMATOSUS in a girl aged 18, where the sebaceous elements in the disease were not well marked, while the scarring was. The disease affected the ordinary situations, and also the hands, where the white atrophic scarring was exceedingly distinct.

(d) A CASE OF VERY TYPICAL LUPUS VULGARIS, with practically no secondary complications. Patient had had the disease as long as she remembered. Her father died of phthisis in her infancy.

(7) *Mr A. G. Miller* exhibited—

(a) A CASE OF INTRA-CRANIAL TUMOUR.

J. B., æt 17, miner, Cowdenbeath. Frontal headache, sickness, slow pulse (56), subnormal temperature, double optic neuritis, rather dull.

Scarlet fever four years ago; discharge from ear, eighteen months; septio. Hearing deficient in right ear; polypus.

*Diagnosis.*—Temporo-sphenoidal abscess, June 26th, 1896. Skull trephined; temporo-sphenoidal lobe of brain explored; great tension, but no pus. Mastoid antrum opened, scraped, and drained. Nothing special found.

*Result.*—Temp., pulse, and respiration rose. Headache relieved; patient more intelligent. Improvement slight; patient subject to relapses; optic neuritis less but persistent.

Cerebellum trephined and explored; no pus found.

Third operation on account of sinus behind ear not closing; roof of tympanum removed (carios); aura exposed; no abscess found. At this operation temp. sphen. again explored. Since this sinus closed, ear almost well.

Patient has become completely blind of left eye.

*Report by Dr Wyllie, October 1896.*—Slight deficiency of power and sensation with tingling in left arm and leg. Slight staggering and tendency to fall on left side. Hearing and intelligence good.

*Diagnosis* = Lesion on right side, most likely cerebellar.

*Present condition.*—Considerable prominence of brain at trephine aperture. Double optic neuritis; slight headache

and tenderness over whole head, except at trephine opening. Temp., subnormal.

*Relapses* = Drowsiness, headache, sickness. Low temp., slow pulse, and respiration two days.

*Diagnosis* = Intracranial tension from abscess (?). Wound healed; no sinus or hernia cerebri; no rigors or other septic symptoms. A tumour and probably tubercular.

(*b*) A patient after amputation at the knee for MALIGNANT ULCER.

A. M., cabman, æt. 43. Varicose ulcer of leg, twenty years. Kick. Unhealed for five years.

Ulcer large, almost round leg. Pain very severe for few weeks before admission.

Discharge copious, watery, and fœtid. Inguinal glands enlarged and indurated. Portions of surface of ulcer removed for examination (looking like large granulations), proved to be epitheliomatous.

*First operation*, 13th Nov. 1896.—Removal of inguinal glands, which, on examination, did not seem to be malignant.

*Second operation*, 18th Nov. 1896.—Disarticulation at knee. Wound quite healed, and patient going about in three weeks.

In *Edinburgh Medical Journal* for July 1895 he described an adaptation of circular method to disarticulation at elbow and knee. Advantage is taken of the retraction of posterior portion of stump at knee to make a long anterior flap by a circular incision. The advantages claimed are—Ease and rapidity of performance; single skin flap which is accustomed to be bent over the condyles, cicatrix in favourable position (well behind), and the ordinary advantages of disarticulation.

The circular cut is made in the case of the knee, 3 inches; and of the elbow, 2 inches, below the level of the articulation. From this it is evident that less tissue is required in this operation than in most for covering the condyles.

The limb must be perfectly straight in both cases when the circular cut is made.

(8.) *Mr Caird* exhibited three patients.

(*a*) DOUBLE ORCHECTOMY FOR PROSTATIC ENLARGEMENT.

Mr L., æt. 71, had spent a year in misery from the constant desire to micturate, when in January 1895 complete retention

developed. Catheterism was effected with difficulty ; he was remote from medical skill ; the urine was ammoniacal, and he was rapidly sinking into a typhoid-like condition. Under the circumstances removal of both testicles was advocated as the most suitable measure. The wounds caused by the operation healed kindly, but he passed through a somewhat anxious period of insomnia and low delirium. The urine, however, rapidly cleared ; a soft catheter could be passed with ease, the residual urine decreased in amount, and in somewhat less than twelve months after the operation his bladder had completely regained power. The prostate beyond which the examining finger could not reach was now dwindled in a marked degree, and the patient is a hale man and enjoys increasing physical and mental health.

(b) AMPUTATION OF UPPER EXTREMITY WITH SHOULDER GIRDLE, except sternal half of the clavicle ; *for* SARCOMA.

J. S., æt. 16. Had an axillary sarcoma removed September 1895. It recurred, and involved the scapula, humeral and axillary structures, whereupon Berger's operation was carried out April 1896. Beyond some tenderness over the divided ends of the brachial plexus, the lad appears in excellent health.

(c) CÆSOPHAGOSTOMY FOR REMOVAL OF PLATE OF ARTIFICIAL TEETH, impacted below the level of the cricoid cartilage.

W. A., æt. 16, was eating plum tart on 27th October, when he imagined he had swallowed one of the stones. Shortly after he experienced a feeling of suffocation, and discovered that his artificial teeth—the upper incisors on a plate  $1\frac{1}{2} \times 1$  in. — had disappeared.

Attempts were made under chloroform, but in vain, to extract the plate. It lay transversely, firmly grasped by the œsophagus, its convex surface upwards. Accordingly the usual incision was made along the left side, the enlarged overlapping thyroid pulled towards the middle line, and the carotid sheath outwards, the œsophagus freely incised, and the teeth removed. The œsophagus was sutured with catgut, the superficial wound was closed, and a drainage tube inserted for three days. The boy was allowed to swallow on second day, as it was thought that no more harm would accrue from the deglutition of fluids than from that of saliva. Discharged healed.

*Mr H. J. Stiles* exhibited—

(a) A case illustrating the difficulty which sometimes exists in distinguishing clinically between a DISTENDED GALL-BLADDER, and a FLOATING KIDNEY. Mr Henry Morris has directed attention to this matter in a very instructive paper, published in the *British Medical Journal*, 1895, vol. I. p. 238. Mr Stiles saw the case with Dr T. J. Thyne in July last, and expressed the opinion that the tumour was probably a distended gall-bladder, but that it was difficult to exclude floating kidney. The patient, a thin married woman aged 25, first noticed the swelling six weeks after the birth of her second child. She complained of a persistent pain in the back, which, latterly, had rendered her unfit for her ordinary household duties; if she kept her bed the pain almost entirely disappeared. There was no history of jaundice or of biliary colic. The abdomen was flat, and the walls lax. Below, and to the right of the umbilicus, was a firm, smooth, painless, freely movable "tumour" the size of a rather large kidney, and very much of the same shape. It could be pushed upwards and to the left beyond the middle line, and it could be readily made to disappear into the right loin; when left to itself, however, it appeared to have a distinct preference for the lower part of the junction of the right lumbar and umbilical regions. The thumbs could be pushed deeply into both loins without being able to feel either kidney. Free manipulation of the swelling caused no pain or sickening sensation. Operation was recommended, but the patient would not then give her consent. In the beginning of October she was seen by two physicians, who were so strongly in favour of floating kidney, that at the operation—to which the patient had now consented—I thought it right to operate from the loin with the view of fixing the kidney should it be found to be "floating." On reaching the extra-peritoneal fat it was evident that the tumour, which was being pushed towards the loin, was altogether in front of the peritoneum, and had the feel of a tense cyst. The kidney, which was very small, was felt to be unusually high up, and quite under cover of the ribs. After closing the wound the abdomen was opened over the upper part of the swelling. The gall-bladder was found to be distended into a tense pyriform cyst, the size of a lemon. A thin tongue-like layer of liver-substance was firmly adherent to the anterior surface of the gall-bladder, and reached half way down to

its fundus : this accounted for the somewhat reniform rather than pyriform shape which the tumour appeared to possess when examined clinically. After bringing the gall-bladder out of the wound, it was opened, and found to contain a clear, colourless mucoid fluid. No calculus was to be felt within reach of the finger. The redundant portion of the gall-bladder was removed and a fistula established by stitching the cut edge to the edge of the abdominal wound. Both wounds ran an aseptic course, and the patient made an uninterrupted recovery. There is now a small fistula from which a slight amount of mucoid fluid escapes. The pain has entirely disappeared, and the patient expresses herself as feeling quite well and able to do her work.

(*b*) A girl, *æ*t. 15, who had been operated on for EXTENSIVE TUBERCULOUS DISEASE OF THE GLANDS OF THE NECK. On the left side the glands occupied almost the whole of the anterior triangle, and extended under the sterno-mastoid muscle into the posterior triangle. An incision was carried parallel to the anterior edge of the sterno-mastoid, from the middle of the mastoid process to the sternum. This allowed of free retraction of the sterno-mastoid, and gave access to the glands beneath and behind it. Following the plan recommended by Mr Watson Cheyne, the internal jugular vein was double-ligatured and divided at the root of the neck, and was then dissected up from off the carotid and vagus, along with the deep chain of glands which were firmly adherent to it ; the vein was divided again between two ligatures at the level of the digastric muscle (specimen shown). Mr Stiles pointed out the advantage of this plan over that of attempting to dissect the glands off the vein ; if they are adherent, the vein is almost certain to be wounded or lacerated, with the result that much time and trouble is occupied in dealing with the hæmorrhage. The right side, upon which the disease was less extensive, was operated upon four months later. Not wishing to interfere seriously with the venous return from the brain, every endeavour was made to preserve the internal jugular vein on this side ; this was done, but not without much tedious dissection.

(*c*) A boy with some PARALYSIS AND ATROPHY OF THE RIGHT SIDE OF THE TONGUE, the result of injury to the hypoglossal nerve during the removal of a mass of adherent tubercular glands from the anterior triangle of the neck. Two or three days after the operation a thick white fur was seen to

confined to the paralysed side of the tongue, which was wrinkled and atrophied looking.

10. *Mr Alexis Thomson* exhibited—

(a) A female infant, aged 9 months, presenting a SHORTENING OF THE RIGHT FEMUR amounting to two inches, apparently the result of arrested development.

(b) A male patient, aged 31, the subject of INOPERABLE MELANOTIC SARCOMA occupying the groin and pelvis, in whom injections of Coley's fluid (toxines of the erysipelas coccus and of the bacillus prodigiosus) had been employed during a period of four weeks without any apparent benefit.

## II. EXHIBITION OF SPECIMENS.

1. *Dr Joseph Bell* exhibited the brain from a CASE OF SUBARACHNOID HÆMORRHAGE AFTER AN EXTENSIVE BURN. (Reported by Dr H. Balfour, House Surgeon, Royal Hospital for Sick Children.) The patient, aged 16 months, was admitted into the Sick Children's Hospital on 13th October 1896, suffering from a burn over the right buttock.

*Family history.*—Both father and mother healthy. Four other children all healthy. One child died teething.

*Personal history.*—Child has always been healthy; had a slight attack of bronchitis, but has had no other illness. Breast fed; weaned two months ago; has been thriving well.

*Present illness.*—About noon to-day child was left seated on hearth-rug playing with little brother; the rug caught fire, and set child's clothes alight, burning the buttocks. Fingers also slightly burnt.

*On admission,* child pale, badly nourished, somewhat collapsed, pulse very dicrotic and compressible. Over whole of right buttock, and extending forward to almost ant. sup. iliac spine, is a severe burn of 3rd degree, as far as can be seen; the tissues are blackened, almost charred in appearance, and hard to touch. The burnt area extends over to left buttock, the anus and posterior portion of perinæum being involved; there is also a large blister on inner side of left thigh. Fingers are also burnt slightly, but not seriously. Child's heart and lungs are normal.

15th October.—Taking nourishment very well; pulse very

fair. Burn constantly dressed with Trinity ointment (Eucalyptus oil 1, Zinc oxide 2, Vaseline 3). Child sleeps well.

*18th October.*—Temperature, which hitherto has not been above 100·2, is 101·8 to-night. Child not quite so well, though taking plenty nourishment. Burnt area commencing to slough away; odour becoming offensive.

*20th October.*—Temperature to-day steadily rose from 100·6 to 101·6. Child not progressing; pulse very feeble at times, and child becomes cold and collapsed; considerable odour from burnt area, which is sloughing off.

*21st October.*—Weaker somewhat to-day, still takes nourishment well, but pulse flickering and easily affected by respiration. Stimulants increased.

*26th October.*—Progressing fairly satisfactorily, the superficial tissues are sloughing off, leaving a raw granulating surface with minute points, where apparently epidermis has not been destroyed. Pulse fairly good; no sign of pneumonia or duodenal ulceration.

*29th October.*—Except for occasional attacks of apparent cardiac weakness, when child appears very collapsed and pulse is hardly perceptible, child is doing well. The superficial tissues have almost completely sloughed away. No pneumonia, no albuminuria. Taking nourishment well. General condition more satisfactory.

*31st October.*—All slough cut away, except a very small piece. Pin point areas of undestroyed epithelium left behind. Pulse and general condition much more satisfactory.

*1st November.*—About four o'clock in the afternoon child got very collapsed, pulse weak, easily compressed, and running about 170. Child cold and face bluish in colour. Liquor strychnine had been ordered to be given during an attack of this sort, but was not given, as the child soon got better. Brandy and digitalis are being given.

*2nd November.*—Case was dressed to-day at about three o'clock, and was looking very well. At four o'clock patient again got collapsed, getting very white, "drawn," and cold. The extremities and tips of the ears were extremely cold, though the child's body, especially the head, was bathed in perspiration. The temperature dropped from 99 to 97. Pulse was 160. Warm bottles and blankets were ordered, and the child's arms were wrapped in cotton wool. Digitalis and strychnine



four-hourly, alternating, were given. At night the temperature had risen to 99·8, and the child was a little better. The strychnine was now stopped. The child had been very restless all day.

*3rd November.*—At four o'clock this morning temperature again dropped to 97·2, but by eight had risen to 99·2. Brandy has been replaced by whisky. The child is not so restless as he has been, but is very white, sunken, and cold. Taking nourishment fairly well. A little strychnine, with good effect, was given. Again in the afternoon the child was collapsed, perspiring, cold, restless, and temperature 101·2, which rose to 101·4. Pulse very weak. At 7.30 in the evening the left arm began to twitch, then the left side of the body. Later the left side of the face was attacked, but only some muscles, *e.g.* muscles of orbit. No muscle which had a fellow-opposing muscle was attacked, bearing out the theory that their centres are elsewhere. The eyes were turned to the right and the pupils dilated. This continued with intervals of more or less quietness till about 11.30. Breathing was very shallow.

*4th November.*—Child died at 12.15 A.M.

*Post-Mortem Examination.*—Nutrition fair, pupils unequal. P.M. rigidity marked. Lividity moderate. On the back, lower half—on left side extending over buttock and partly on inner side of thigh; on the right side, extending from twelfth rib downwards, over buttock and posterior surface of thigh, and extending anteriorly as far as iliac spine, is a large raw surface; surface is granulating. *Thorax.*—Pericardium contains half an ounce of clear serous fluid. No pleurisy. *Heart.*—Ventricles full of clotted blood. Right ventricle walls thin, some dilatation, particularly towards apex. Left ventricle normal. *Lungs.*—Left slight emphysema, some hypostatic congestion, otherwise normal. Right rather more congested. *Abdomen.*—Intestine normal, spleen ditto. Liver somewhat pale, and on section shows slight cloudy swelling. *Kidney.*—Left pale, particularly cortex and apex of pyramids, malpighian bodies prominent, contains some purulent fluid in pelvis. Right is slightly pale. *Head.*—On opening skull and removing brain there was seen extensive sub-arachnoid hæmorrhagic effusion over right frontal region and ascending parietal. Also general sub-arachnoid effusion of watery nature. Sinuses thrombosed. On right side the lateral sinus contains breaking-up anti-mortem septic clot. After brain had been hardened in formaline, it was

carefully examined. On the right side was found extensive sub-arachnoid hæmorrhage. This covered the whole frontal region, with the exception of a portion on the inner surface of the cerebrum, and the upper part of the ascending frontal and supra-frontal convolutions. Posteriorly it extends along the Sylvian Fissure, and spreads from it upwards and downwards, over the parietal lobe and tempero-sphenoidal lobe. The ascending parietal and portion of convolutions just behind is free of hæmorrhage. The posterior part of the parietal and anterior part of the occipital lobes also show hæmorrhage, but this is more petechial in nature. The base of the brain shows thickening of the membranes, and there are adhesions between the frontal lobes, and between frontal and tempero-sphenoidal lobes. No evidence of middle ear disease.

Death occurred twenty-two days after burn from cerebral hæmorrhage.

2. *Sir Henry D. Littlejohn* exhibited—

(a) A REMARKABLE CASE OF SUICIDAL WOUND OF THE NECK which measured three inches transversely by one and a half, and from which eight inches of the œsophagus was hanging. The windpipe had been entirely divided with an ordinary table knife. A tumour, the size of a pigeon's egg, had been detached from the wound, and was found lying on the bed in front of deceased, who had for some days previous shewed signs of great mental depression.

(b) AN ORDINARY SPECIMEN OF AORTIC ANEURISM, the size of a small orange and in the usual situation. The interest of the case lay in the fact that deceased was assaulted chiefly about the head and face. Injuries were not serious, but death occurred suddenly two hours afterwards. The question arose as to the connection of the aneurism (which had not ruptured) with the fatal issue following the receipt of injuries. The case was brought to trial, and a verdict of not guilty was returned by the jury.

3. *Dr Milne Murray* exhibited—

AN OVARIAN TUMOUR from a patient with non-typical symptoms and illustrating the difficulty of diagnosis of pelvic tumours.

The patient from whom this tumour was removed is sixty-eight years of age. She is the mother of three children.

Eighteen years ago she consulted the late Dr Thomas Keith, on account of an increasing difficulty in getting the bowels to act, and occasional backache. At this time she was menstruating, though somewhat irregularly. Dr Keith, after examining her, told her she had a fibroid tumour of the womb which had probably been there for some time, but that, considering her age, it was not likely to give her any further trouble. Three years later she saw the late Dr Angus Macdonald, not, so far as Dr Murray can learn, on account of any new symptoms, but simply to be assured that nothing was going wrong. Dr Macdonald confirmed Dr Keith's opinion, telling her the tumour was apparently as the latter had found it. The year after Dr Macdonald's death she again saw Dr Keith, who assured her the tumour was precisely as it was when he first examined her.

Three years ago, in 1893, while on a visit to Edinburgh, she consulted Dr Murray. Beyond occasional attacks of constipation, she had nothing to complain of. He found, on vaginal examination, a firm, compact tumour, about the size of a fist, lying behind the uterus, somewhat to the left side. It seemed to be closely connected to the uterus, and could not be displaced. The sound passed forward three and a half inches. The mass felt like a dense subperitoneal fibroid growing from the posterior uterine wall. He told her that he had no doubt it was a fibroid, and that it had probably undergone little or no change since she was last examined, and that she need not give herself any further trouble about it.

In the end of July last she came to see him, and told him she was afraid the tumour was beginning to grow, as she had been feeling more uncomfortable and thought she was getting larger. On placing his hand over the abdomen, he could feel a firm tumour well out of the pelvis, indeed, nearly halfway to the umbilicus. The solid mass could be felt as formerly in the pelvis. He told her it was undoubtedly growing, and asked her to return in a month. Circumstances prevented her doing so, but she came back in the end of October. He now found the tumour half-way between the umbilicus and xiphisterraum, and very prominent. It was now distinctly cystic, but the firm mass was still in the pelvis. He advised her to have it removed, and she returned on the 24th November. The abdomen had increased one inch in circumference since the last examination. He concluded that it was most likely a dermoid

ovarian tumour which had taken an active growth. On the 27th November, with Dr Haultain's assistance, he opened the abdomen. On tapping the cyst, a large quantity of thick yellow fluid, quite like what we find in dermoid tumours, escaped. The mass was easily removed from the pelvis, and a short broad pedicle was found which was tied without difficulty. The patient has made an excellent recovery.

To the naked eye the tumour, externally after removal, presented all the characters of a dermoid. On cutting into the solid part, however, it was found to contain no dermoid structures, but to consist of a mass of small cysts with a quantity of yellow material.

Dr Leith kindly examined a portion microscopically, and found that it presented all the characters of a multilocular ovarian tumour, sharing the typical ingrowths and all the other well-known features.

The case is a good illustration of the difficulty which surrounds the diagnosis of pelvic and abdominal tumours, and is of interest in so far as its clinical history does not correspond with the usual symptoms of a multilocular ovarian tumour. Thus menstruation persisted till fifty, in spite of the presence of this tumour, and it remained in a quiescent state for nearly eighteen years after its first discovery, and then developed with very great rapidity. This last phenomenon is certainly more characteristic of dermoids than of ordinary ovarian tumours.

4. *Dr Alexander Bruce (a)* demonstrated a case of COMBINED CONGENITAL HYDROCEPHALUS AND SPINA BIFIDA. The spina bifida was of the common form of meningo-myelocoele, the nerve roots of the cauda equina passing along the wall of the cyst. The hydrocephalus presented some special features pointing to its origin in an error of development. A peculiar soft vascular tissue lay behind the medulla and cord in the upper part of the spinal canal. This was seen on further examination to be an aberrant portion of cerebellum. This will be described in a future communication.

(*b*) Exhibited TRANSVERSE SECTIONS OF SPINAL CORD from a case of the family form of progressive muscular atrophy, called by the name of Charcot Marie. The sections (which were prepared from portions of cord presented to him by Professor Marie)

demonstrated an area of sclerosis in the posterior columns somewhat recalling that seen in locomotor ataxia.

(c) Sections of five cases of SYRINGOMYELIA were also exhibited. In these, four of gliomatous tissue of various sizes were seen round the central canal, and extending into the posterior cornua.

(d) An unique specimen of the combined form of AMYLOID DISEASE OF THE SPLEEN. This, which presented the colour and consistence of a mass of beeswax, weighed nine pounds, and was six and a half inches long by three inches in its greatest transverse diameter. The specimen, when examined under the microscope in sections, showed amyloid degeneration in the pulp, malpighian bodies, and trabeculæ. It was obtained from a case in which there was no history or evidence of any of the usual causes of amyloid disease.

5. *Dr M'Kenzie Johnston* exhibited several foreign bodies removed by him from the nose and ear—

(a) An ivory shirt stud, which had remained seven years in the nose without marked symptoms.

(b) A tooth which had been introduced far into the auditory meatus of a child of six.

(c) The lens from a haddock's eye removed from a child's ear.

6. *Dr Muir* gave a demonstration of the method of "SERUM-DIAGNOSIS" OF TYPHOID FEVER, showing the appearance which actively motile typhoid bacilli present when placed in (a) diluted normal blood serum, (b) the diluted blood serum of a patient suffering from typhoid fever. In the latter they lose their motility, usually in a few minutes, and become agglutinated into clumps. In the former, and in the serum in other diseases, they remain actively motile.

*Method.*—He stated that the method he had employed successfully in a considerable number of cases, both of typhoid and of other diseases, was a modification of those of Widal and of Grünbaum. The ear or finger of the patient supposed to be suffering from typhoid is well cleansed with water (an anti-septic should not be used), the skin is then pricked, and by means of a leucocytometer pipette blood is drawn up to the mark I, then sterile bouillon is drawn up after the blood till the

mark II is reached, and the two are thoroughly mixed in the usual way by shaking the tube. By this means the blood is diluted in the proportion of 1:10. The mixture thus obtained can be used at once, but it is better to separate the red corpuscles as far as possible. If a centrifuge is available, the separation can be readily effected in the following manner:— A piece of thin glass tube, with bore say of  $\frac{1}{16}$ , and about six inches in length, is bent into a U-form by heating the central portion (many such tubes can be rapidly made at one time, and kept for subsequent use). Into this tube the mixture from the pipette is blown, the tube is placed in the centrifuge and treated in the usual way. The result is that all the corpuscles are collected in a mass at the bend, and a clear fluid, the diluted serum, is in the limbs of the tube. If the use of a centrifuge cannot be obtained, the mixture may be placed in a straight thin glass tube, and after an hour or two the upper part of the fluid will be comparatively clear. To test the effects of the serum thus diluted, a small quantity of recent typhoid culture on agar (of not more than twenty-four hours' growth) is taken by a platinum needle and mixed carefully with a little bouillon in a watch-glass. A uniform turbidity should be obtained, and this is best effected by breaking down the portion of culture at the margin of the fluid and afterwards mixing. A drop of the diluted serum is taken from the U-tube (conveniently by means of a glass tube drawn out at the end to a capillary tube) and mixed on a slide with a drop of the bouillon containing the typhoid bacilli; a slide with a hollow cell being preferable. A cover-glass is placed on the mixture, and the specimen is watched under the microscope, a magnification of three hundred diameters being quite sufficient. In a typhoid case, the bacilli in such a preparation, if examined at once, will be seen to be actively motile, but afterwards, usually in a minute or two, their movements become less active, and they begin to adhere to one another and form little clumps. A little later they are practically all arranged in immobile masses, though for some time a stray motile bacillus may occasionally be seen. A control specimen should always be made with normal blood at the same time, so as to avoid the possibility of any fallacy. If the drop of diluted serum be equal to the drop of bouillon containing the bacilli, the serum will be present in the proportion of 1:20. This has given the reaction quite well in all the cases

of typhoid fever tested, but it is safer to add two drops of the former to one of the latter. In this way the dilution is 1:15, which is the proportion recommended by Widal.

The above method in practice is found to be very simple and rapid, but another excellent method, involving less apparatus, viz., that of Prof. Délépine, may be mentioned. A thin glass-tube, say one-eighth in. in diameter, is taken and two constrictions are made at a short distance apart by heating and drawing out in a flame. In this manner a small bulb is formed sufficient to contain a large drop of blood. The tube is broken at one of the constrictions and blood from the patient is drawn into the bulb, and for transport the capillary extremity is fused in a flame. When the test is to be made a drop is blown out, placed on a cover-glass and mixed with ten drops of a young typhoid culture in bouillon. (Drops of practically the same size can be readily taken by means of a loop at the end of a platinum needle.) The mixture is then placed on a slide and examined in the usual way.

The claims which this test has as a means of diagnosis depend upon (*a*) the results obtained by its use, and (*b*) the fact that it rests on a thoroughly scientific basis. With regard to the former, it may be stated that the opinion of competent observers is practically unanimous in its favour. Erroneous results may of course arise from the fault of the observer, but even these are not very liable to occur if care is used. Usually the reaction appears about the sixth to eighth day of the disease, and becomes more marked as the disease progresses, continuing as a rule for weeks or even months after recovery, though it gradually becomes less and less distinct. An important point yet to be determined is the minimum amount of dilution of the serum which can be used with safety—*i.e.* so that the possibility of the reaction being given in diseases other than typhoid may be excluded. For the smaller the amount of dilution the more delicate will the reaction be—the earlier will it be given in the disease and the more distinct will it be in mild cases.

This reaction has been the outcome of a long series of researches on artificial immunity and the properties of the serum of immune animals, and on reading the recent literature on these subjects, it is not surprising that the test should have been discovered independently by two observers—viz. by Widal and Grünbaum, though the former had priority. The work of

Metchnikoff, of Pfeiffer, of Bordet, and of Gruber and Durham may be specially mentioned as leading up to the discovery. Immunity against a given organism may result in two ways, viz., by the development of substances in the body which neutralise the toxins of the organism, *antitoxins*, and by the development of substances which impair the vitality and activity of the organism, and thus aid in its destruction, *anti-microbial substances*. Now with regard to the latter it had been shown that the serum of an animal immunised against a given organism had in some cases a bactericidal action against the corresponding organism, in others a paralysing action, immobilising the organism if it were motile. It had also been shown that the serum of a highly immunised animal when injected with the corresponding organism into another animal conferred immunity, the organisms within the peritoneum, for example, of the latter animal becoming immobile and then degenerating (Pfeiffer's reaction). Further it was found that in the case both of cholera and typhoid the serum of convalescents could protect an animal against the cholera and typhoid organisms respectively and gave the same reaction. It then appeared a natural thing to enquire at what period in the disease these anti-microbial or paralysing substances were developed in the blood in the natural disease and the result in the case of typhoid has been as stated above. The serum reaction in typhoid would therefore appear to be the indication of the development of substances in the blood, which have an antagonising or paralysing action towards the typhoid bacillus, their development gradually increasing till the cure of the disease takes place. It is further to be noted that the reaction is specific, and is not exerted towards other organisms—*e.g.*, the bacillus coli communis. It thus supplies additional evidence that the typhoid bacillus is the real cause of the disease.

7. *Dr Norman Walker* exhibited under the microscope—

- (a) SPECIMEN OF RINGWORM OF THE BEARD.
- (b) A SECTION OF SKIN WITH RINGWORM.

8. *Mr Caird* exhibited a series of PREPARATIONS FROM THE ILEO CAECAL REGION OF THE INTESTINE.

- (a) Cæcum with half of ascending colon removed for extensive carcinomatous stricture. End to end union of ileum with colon.



Mr P., æt. 45. Operation 28th November 1896. Healed 8th December.

(b) Cæcum with ascending colon, removed for ulcerating carcinoma of colon. End to end union of ileum with hepatic flexure of colon.

Mr M., æt. 66. Operation October 1896. Fœcal fistula formed 10 days after operation; still discharging.

(c) Cæcum with two-thirds ascending colon, removed on account of a tumour-like mass of matted appendix, colon and omentum. Probably inflammation due to an appendicitis, with perhaps early carcinoma.

Mr C., æt. 28. Operation 20th August 1896. Healed 30th August.

(d) Cæcum with half the colon removed for simple stricture due to localised multiple papillomata at ileo-cæcal valve.

S., æt. 7. Operation of removal and formation of artificial anus, 1st June 1895. End to end anastomosis 5th June 1895.

(e) Cæcum with half the ascending colon removed for carcinoma of ileo-cæcal valve.

Miss K., æt. . Operation 27th March 1893.

In each case an extensive amount of intestine had to be removed owing to the large amount of adhesion and puckering at the affected area. Fine silk was employed for suturing. The cases are consecutive and the patients are all in good health.

9. *Mr H. J. Stiles* exhibited—

(a) A SPECIMEN OF CARCINOMA OF MAMMA AND AXILLARY GLANDS from a case which clinically resembled tubercle rather than carcinoma.

The patient from whom the specimen was derived was a female, aged 35 years. When first seen by me, ten days prior to the operation, there was in the right axilla, a nodular, firm swelling, the size of an adult's fist; it was slightly movable, and the skin was not tacked down over it. Some isolated enlarged glands were felt higher up towards the apex of the axilla, and one or two glands above the clavicle were slightly enlarged. The anterior edge of the main mass came in contact with the axillary edge of the mamma, but no abnormality whatever could be detected in connection with this organ. There was a history of pleurisy on the right side, but there was no tubercular family history. Dr Lundie, who sent the

patient to see me, regarded the mass as tubercular, an opinion in which I concurred. Professor Chiene, who had previously seen the case, informs me that he had come to the same conclusion. At the operation it was found that the mass in the axilla was cancerous, and that adjacent to it, at the extreme axillary border of the mamma, was a very small atrophic-looking primary tumour. The patient died five weeks after the operation, the symptoms all pointing to a secondary growth in the region of the pons.

(b) THE TEMPORAL BONE AND SEQUESTRUM FROM SPHENOID, from a case of middle-ear disease.

This sequestrum was removed *post-mortem* from a girl aged 10 years who had suffered from chronic suppurative otorrhœa for several months. She died of Bright's disease. The liver, spleen, kidneys, and intestine all showed advanced waxy disease. There was advanced caries of the temporal bone, which had led to a large extra-dural abscess of the middle fossa; the bony wall of the lateral sinus was partly destroyed, and the sigmoid sinus itself contained a septic thrombus. On removing the temporal bone the above-mentioned sequestrum was found lying, quite loose, at the base of the skull.

10. *Dr R. A. Lundie* exhibited A DRAWING OF A BRAIN WITH A TUMOUR IN THE CEREBELLUM. The patient, an architect, aged 34, first noticed five years ago that the hearing of his left ear was failing. About two years after this, he began to suffer from intense giddiness on turning or inclining the head to the left; and a little later experienced from time to time extremely distressing visceral sensations, sometimes with a presentiment of impending death. Double vision came on about six months ago. These symptoms were all present when he first came under observation last September. Severe headache was present for a time, but had now ceased. There was slight unsteadiness in standing with the eyes closed; sometimes, but not always, a fine rhythmical tremor of the body generally; a very slight tendency to incline to the left in walking; internal strabismus, and slight nystagmus, moderately severe optic neuritis, great defect of hearing in the left ear without visible cause. *Dr G. A. Gibson* and Professor Chiene also saw the case, and it was agreed that there was a cerebral tumour present, far back on the left side, most likely in the

cerebellum. As medicinal treatment had no effect on the symptoms, Professor Chiene admitted him to his ward in the Royal Infirmary, and on 21st November explored both the left side of the cerebellum and the left occipital lobe without detecting anything abnormal except greatly increased intracranial pressure. The patient died a week later from meningitis.

After death a glioma was found on the anterior inferior aspect of the cerebellum, growing from the flocculus, and producing such extreme distortion of the medulla and pons that it was difficult to understand how the patient had escaped well-marked paralysis of some of the limbs.

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### Meeting IV.—January 13, 1897

DR ARGYLL ROBERTSON, *President, in the Chair*

#### I. LETTER OF CONGRATULATION TO LORD LISTER

On the motion of the President, seconded by Dr Joseph Bell, the Senior Secretary was instructed to convey the congratulations of the Society to Sir Joseph Lister, Bart. (an Honorary Member of the Society), on his elevation to the Peerage.

#### II. ELECTION OF MEMBERS

A. A. Scot Skirving, M.B. C.M., 29 Drummond Place, and Theodore Shennan, M.D., 71 Leamington Terrace, were elected Ordinary Members of the Society.

#### III. EXHIBITION OF PATIENTS

1. *Dr Affleck* exhibited a patient recently under treatment in the Royal Infirmary for CEREBRAL SYPHILIS, who had now almost completely recovered.

On admission the patient, a woman, aged 35, was suffering from severe headache with paroxysmal vomiting, which had

existed for about five weeks. There was ptosis of the right eyelid, and complete paralysis of all the muscles supplied by the right third nerve. This was followed shortly after her admission by paralysis of the fourth, and later on of the sixth, nerve. There was no optic neuritis. The history of syphilis was unmistakable.

The patient was treated with potassium iodide and liq. hydrargyri perchloridi in increasing doses until one drachm of each was taken thrice daily. Improvement speedily followed in all the symptoms, the vomiting and headache disappearing, and the paralysis of the ocular muscles passing off. All that now remained (two months after the treatment was begun) was slight paresis of the superior rectus muscle.

The symptoms were in all probability due to a gummatous neoplasm or meningitis implicating the nerves named in their passage forward to the orbit at some point in front of the pons.

Photographs showing the patient's appearance before and after treatment were exhibited.

## 2. *Mr Miles* exhibited—

(a) A PATIENT AFTER EXCISION OF TONGUE FOR MALIGNANT DISEASE. The chief clinical point of interest in this case was the difficulty in diagnosis. The patient, aged 59, who has been much abroad as a sailor, denied ever having had syphilis, although the importance of having this point definitely established was clearly explained to, and apparently appreciated by, him. At the same time the clinical history of the swelling on the tongue was in an especial degree characteristic of a syphilitic growth. On the other hand, the physical signs on his coming under observation pointed as surely to a cancerous condition. The administration of iodide of potash in full doses was followed for a week by a marked diminution in the size and firmness of the swelling, but although the drug was continued for another fortnight no further improvement took place, and during this time there was an increase both in the size and number of glands palpable under the jaw. A portion of the tumour was removed for microscopic examination, and its character as a malignant adenoma, probably growing from mucous glands, was established.

The points worthy of mention in connection with the operation were (1) that in removing the enlarged glands, which,

on both sides, extended a considerably greater distance along the carotid sheath than could be made out by palpation, advantage was taken of the opening to ligature the lingual arteries. (2) On account of the large size of the tongue access was not easy. The extraction of an upper lateral incisor and a lower premolar tooth was found to increase the space available for the use of the scissors greatly. (3) The disease infiltrated the floor of the mouth on the right side, and the removal of it established an opening with the external incision, which, however, closed in a few days. (4) The patient has made an uneventful recovery. He was out of bed on the eighth day, and since the operation (seven weeks) has gained  $7\frac{1}{2}$  lbs. in weight.

The tongue and glands excised were exhibited.

(b) A PATIENT AFTER OPERATION FOR AGGRAVATED TALIPES. The boy, aged 10, was born with both feet in the position of equino-varus. When seen in April, 1896, the feet were much deformed. The tread was on the dorsal aspect of the fifth metatarsal bone, the sole looking inwards and backwards; one foot being lifted over the other in walking. The muscles of the legs were small and atrophied. All the tendinous and fascial structures on the inner side and sole of the foot were much contracted; and as the boy had never worn boots or shoes in his life, several large adventitious bursæ and callosities had developed. Superficial ulcerations on these were the cause of his coming to Leith Hospital.

An operation having been suggested and agreed to, some time was spent in purifying the skin of the feet and removing the enormous overgrowth of epidermis which had formed. This done, the operation on the right foot was proceeded with. It consisted in first dividing all the soft structures which retained the foot in the varus position, and then removing a wedge of bone, including the head and neck of the astragalus, the anterior part of the os calcis, and almost the whole of the cuboid bone. When the varus was completely undone the tendo Achillis was divided, and the equinus disappeared. Primary union followed, and the position of the foot was gradually rectified by means of bandaging and simple splints. Later a plaster case was applied to allow of consolidation of parts.

Two months later, after the same preliminary purification, the other (left) foot was attacked by a similar operation. The

bones removed on this side were the greater part of the astragalus, the whole scaphoid, part of the middle cuneiform, and part of the os calcis. The after treatment was the same.

The boy has now been walking about for about four months, and the muscles of his legs are gradually becoming stronger.

Casts and photographs of the feet before and after operation were exhibited.

3. *Dr C. W. MacGillivray* exhibited a patient, a man, æt. 30, who was sent to him by *Dr Murray* of Leith in the beginning of last October. He had always been very healthy until about three years ago, when he suddenly was attacked with severe pain in the left loin and side, which lasted for about twenty-four hours, and was accompanied by urinary irritation. This was diagnosed as renal colic, and has recurred ever since at irregular intervals, sometimes every fortnight, at other times not for several months. The attacks have been mostly on the left side, but on several occasions severe pain with retraction of the testicle has been felt on the right side. All symptoms disappeared when the patient rested, but on resuming work an attack was liable to occur. The patient was under treatment in America, and the reports there given state that his urine contained pus, blood, epithelium, and oxalate of lime crystals. But no gravel was ever passed. A calculus in his kidney was diagnosed, but he was recommended to come home to Edinburgh for treatment. On examination nothing beyond a slight pain on pressure over the left kidney was to be made out; his urine was pale, straw-coloured acid, sp. gr. 1020, with no crystals, but a trace of albumen. He was kept in bed on milk diet and Centrexeville water. But as he thus remained perfectly well, except for slight pain after exertion, an operation was recommended on November 13th, and *Dr MacGillivray* operated by the usual dorsal incision. The kidney was exposed and drawn out, an indistinct hard nodule was felt in the pelvis, the convex edge was punctured with sinus forceps. But no stone could be felt. On enlarging the puncture and introducing the little finger, a stone three-quarters of an inch in length was felt in the pelvis and removed with dressing forceps; the ureter was probed, but no other stone was to be discovered. A drainage-tube was introduced down to but not into the kidney, and

the wound sutured ; the patient made an uninterrupted recovery without any rise of temperature. The tube was withdrawn on the third day, and the wound healed without one drop of urine passing from the wound, though the urine passed naturally was very bloody for two days. On the 8th of December, when the patient had been up and going about for about a fortnight, a sudden and severe attack of pain on the right side occurred, and the temperature rose to nearly 104. The fever and pain continued for a fortnight, but nothing beyond tenderness could be made out. At the end of that time his urine, which up till now had remained clear, became white and thick, and was found to contain a large quantity of pus ; and the next day, after considerable pain, he passed a calculus the size of a pea. Since then everything has gone on well, and his urine has gradually become clear, and, though still a little weak, he feels perfectly well.

The case is so far interesting in as much as the patient at no time was aware of passing any calculus or gravel, and that he should when under treatment, and after the removal of the calculus from the left kidney, have passed a calculus from the right kidney, which evidently plugged the right ureter and produced a passing condition of pyonephrosis.

#### IV. EXHIBITIONS OF SPECIMENS.

1. *Dr Affleck* exhibited photographs shewing the appearance, before and after treatment, of the SYPHILITIC PATIENT whom he had exhibited to the Society.

2. *Mr Miles* exhibited—

(a) THE TONGUE AND GLANDS from the patient he had shown to the Society.

(b) CASTS AND PHOTOGRAPHS of the patient on whom he had operated for talipes.

(c) CAST OF AN UNOBLITERATED MECKEL'S DIVERTICULUM taken from a boy, four and a half months old. The mother was confined by Dr Whyte of Parson's Green, and nothing abnormal was observed at birth. A week later, the stump of the cord had sloughed off, leaving a small projecting ulcerated surface. When three weeks old the child suffered from a severe attack of gastritis, accompanied by much retching and vomiting, the

child crying a great deal. A very tight phymosis added to the trouble by causing straining and pain on micturition. The umbilical projection was still raw, and, on examination, it was found that intestinal contents escaped in small quantity from a small opening in the centre of it. The patient was taken to the Royal Hospital for Sick Children, but as the mother would not allow it to remain there, no treatment was carried out. Mr Miles saw the patient with Dr Whyte when it was four and a half months old. A small bluish conical mass like an umbilical hernia projected in the middle of the umbilicus, and from the apex of this a tube of red mucous membrane, about half an inch long, was prolapsed. From a punctum at the tip of this, mucus and intestinal contents continued to escape. As it appeared evident that the straining and crying incident to the tight prepuce were to blame for this prolapse, the child was circumcised, and at the same time a silk ligature was tied tightly round the prolapsed mucous membrane in order to strangulate it. The result was the immediate cessation of all trouble with micturition, and a speedy closure of the umbilical opening. When seen a month after operation, the child was in good health, the umbilical protrusion had all but disappeared, and the opening in it was completely closed.

3. *Dr C. W. MacGillivray* exhibited—

(a) THE CALCULUS he removed from the patient already shown to the Society.

(b) A KIDNEY which he removed the other day from a miner, twenty-two years of age. His history was that until two years ago he was perfectly well, and had never suffered from any urinary troubles. At that time he commenced to suffer from severe and sudden attacks of pain in the left side, which led to vomiting, and after lasting from eight to twenty-four hours, passed off. At that time he had no urinary symptoms, but about August of this year the attacks became more severe and frequent, and were followed by white discolouration and thickness of the water, worst after the attacks but generally present, but still without urinary irritation or blood. In other respects he was perfectly normal, and no swelling, but only deep-seated pain on pressure were to be found in the left side. There were no tubercle bacilli present, and the cystoscope showed an absolutely healthy bladder, and beyond the fact that the urine



was pale and alkaline with pus and a few triple phosphatic crystals, nothing was to be made out.

The diagnosis was between a calculus and pyonephrosis and tubercular kidney.

On cutting down on the kidney, it was found soft and collapsed, with only a thin layer of kidney substance remaining. A calculus was found in the pelvis, and there was a small opening about the size of a quill separating the dilated pelvis and calyces from the dilated ureter, which was about the size of one's thumb. The calculus evidently occasionally obstructed the upper end of the ureter and produced pyonephrosis; why the ureter was dilated was not so evident as no calculus could be felt in it on probing; probably the lower end was more or less obstructed by pus and debris. The vessels were ligatured *en masse*, the ureter stitched to the lumbar fascia, and two tubes deeply placed in the wound. The patient has not had a bad symptom since, and is rapidly recovering.

(c) SPECIMEN OF RUPTURE OF THE BLADDER, which occurred on a Thursday night, the cause being unknown, as the patient was under the influence of stimulants. He had much pain and was unable to pass water, and on a catheter being passed, only a little bloody urine was drawn off. Dr MacGillivray did not see him until forty-eight hours after the accident, when he was comparatively comfortable: pulse 72, tongue clean, respiration a little quickened, temp. 100, pain and board-like hardness over lower segment of abdomen, no distension, legs extended. Twelve oz. of slightly reddish urine had been drawn off two hours previously. Probably rupture of bladder diagnosed, but whether extra or intra-peritoneal doubtful.

On cutting down above pubes, pelvic cellular tissue normal, on opening peritoneal cavity, finger at once passed into bladder through crucial rent, two inches long and nearly the same broad, wonderfully little peritonitis, and some bloody fluid not less than a teacupful in Douglas's pouch, stitched up opening, washed out peritoneum, inserted glass tube, and drained bladder by Sprengel's syphon tube. Next day, patient very well, pulse 84, temp. 100, but bringing up a large quantity of bile in mouthfuls, had restless, bad night with increasing collapse, and sank and died thirty-six hours after the operation.

Case interesting as showing how few symptoms such a

severe injury may produce, and had an earlier operation been performed at a certain period a more successful result might have been expected. As the patient apparently died of toxic poisoning from absorption from the peritoneal cavity, the bladder was found after death to be perfectly water-tight.

He trusted the members of the society would pardon his taking up so much of their time, but the cases seemed to him sufficiently interesting to justify his bringing them under their notice.

## V. ORIGINAL COMMUNICATION

### AGRAPHIA

#### *And the Question of the Existence of a Special Graphic Centre*

By WILLIAM ELDER, M.D., F.R.C.P. Ed., Physician to Leith Hospital

HAVING for some time been engaged in a clinical study of aphasia, I thought it might not be without interest to members of this Society if I extracted from my observations<sup>1</sup> what has a bearing on graphic aphasia, or, as it is more correctly designated, agraphia.

Agraphia has been known for many years to be a frequent symptom in all the types of aphasia, but the question as to whether there was a type of aphasia which could be strictly called graphic aphasia without any other lesion is one that has been much discussed in recent years.

In order to bring the subject properly before you, it will be necessary for me to shortly summarise what we know of aphasia as a whole and what part the symptom of agraphia plays in the manifestation of its different forms.

Putting aside, in the meantime, graphic aphasia as a special form, it is now very generally believed that there are four great types of aphasia, viz:—

(1) Auditory aphasia or word-deafness. The sensory aphasia of Wernicke due to a blotting-out of the auditory images of words, which are believed to be stored in the posterior  $\frac{1}{2}$  or  $\frac{2}{3}$  of the first temporo-sphenoidal convolution on the left side.

(2) Visual aphasia or word-blindness, due to a blotting-out of the visual images of letters, figures and words, which

<sup>1</sup> Elder. "Aphasia and the Cerebral Speech Mechanism." In the Press.

images are believed to be stored in the angular gyrus and neighbouring part of the supra-marginal convolution on the left side.

(3) Motor aphasia or aphemia or Broca's type of aphasia, due to a blotting-out of the articulatory images of words, which are believed to be stored in the posterior part of the third left frontal convolution on the left side.

(4) Conduction aphasia (*Leitungsaphasie* of Wernicke), due to an interruption in the fibres communicating between the sensory and the motor speech areas. Lesions in the bottom of the fissure of Sylvius and the Island of Reil usually produce this form of aphasia.

There are several varieties of each of those types, differing, it is believed, according to the precise localisation of the lesion producing the type. It can easily be understood that a lesion which destroys a centre, either sensory or motor, will produce different symptoms from a lesion interrupting the fibres either going to or coming from that centre.

Wernicke,<sup>1</sup> who was the first to clearly differentiate sensory aphasias from motor aphasias, pointed out this very clearly, and he proposed to name the form of aphasia produced by a lesion in the fibres going to a centre "subcortical"; whilst he applied the word "cortical" to a lesion of the centre itself, and the word "transcortical" to a lesion in the fibres passing from the centre to the higher parts of the cerebral cortex.<sup>2</sup>

According to that classification, therefore, there may be theoretically subcortical, cortical and transcortical auditory, or, as Wernicke called them, sensory aphasias; subcortical, cortical and transcortical visual aphasias; and subcortical, cortical and transcortical motor aphasias.

As conduction aphasias are probably only lesions in fibres such a classification does not apply to them.

These terms have been pretty generally accepted, but Wyllie,<sup>3</sup> in order to overcome some objections to them, proposed that the word "pictorial" should be substituted for the word "cortical," and he proposed to call the "subcortical" form the "infra-pictorial," the cortical form the pictorial, and the trans-

<sup>1</sup> Wernicke. "Der Aphasische Symptom-Complex." 1874.

<sup>2</sup> Wernicke. *Fortsch. der Med.* XI., 1886, p. 463.

<sup>3</sup> Wyllie. "Disorders of Speech."

Dictation of words "To & Man."

Voluntary writing of name "Robert Russell."

Dictation of letter "O."

Dictation of Figures "1, 2, 3, 4, 5."

Voluntary writing "1 to 5."

Copy of printed word "NORTH"

Copy of the word North as written above.

cortical form the supra-pictorial. The suggestion is a good one, as the word pictorial suggests at once the pictures or images of the words stored in the cortical centres.

I shall shortly indicate what are the graphic symptoms in each of the varieties of aphasia.

I. In auditory aphasia the patient is usually able to write voluntarily, although, if the lesion is cortical, that is, pictorial auditory, there is usually paraphagia in his voluntary writing as there is paraphasia in his voluntary speaking.

Paraphagia is the term applied to writing the incorrect word, and paraphasia to speaking the incorrect word. Theoretically, there are two forms of paraphagia, the one form due to paraphasia where the incorrect word-memory is raised in the psycho-motor speech centre (*i.e.*, the centre of Broca). The patient in that case writes correctly the paraphasic word, but in the other theoretical form it is possible for the patient to write incorrectly the letters of a word which would be correctly spoken; or he might write a different word from the word he spoke, or he might trace incorrect lines in writing the letters. These would be all different varieties of paraphagia, and I shall pass round specimens of writing which show these characteristics (Figs. 1, 2 and 3).

As there is usually more or less amnesia verbalis in auditory aphasia cases, the patient shows this symptom also in his writing. He fails to recall the word he requires, and sometimes makes mistakes in the syllables in writing as he does in speaking.

Auditory aphasia cases have agraphia to dictation, except the supra-pictorial form, where the patient may be able to write letters and short words, but not long words nor sentences to dictation. This is because in the pictorial and infra-pictorial form the patient cannot hear words, whereas in the supra-pictorial form his word-hearing centre is intact, although the word-sounds do not reach his intelligence; the writing to dictation being almost what might be called a reflex act. The patient is usually able to copy when he suffers from auditory aphasia, but only as a tracing in the pictorial and supra-pictorial form, whereas he can copy intelligently in the infra-pictorial form. This is because the auditory centre requires to be intact in order that the visual images of words may reach the intelligence.

II. In visual aphasias or word-blindness, if the lesion is infra-pictorial (the "Cécité verbale pure" of Dejerine), the patient is able to write voluntarily and to dictation, but there are great disturbances in his powers of copying; he can not copy intelligently, he may not even be able to trace as a drawing.

A case of word-blindness of this sort I had some time ago, actually wrote a letter whilst in this condition, but was not able

Volitional writing.

D      en      is      commences  
 about fortnight a piece at least  
 about fortnight  
 L<sup>o</sup>      en      about fortnight  
 through my hand, I began to  
 map my best, and once again  
 then I have again repeated

FIG. 2 (SLIGHTLY REDUCED).—COPY OF WRITING OF CONDUCTION APHASIA CASE.

to read what she had written; and it was noticed in the letter that some of the sentences were repeated over again, as she could not intelligently see what she had written, although her sight was quite good.

In pictorial or cortical visual aphasia, on the other hand (as proved by Dejerine), the patient is not able to write spontaneously, nor to dictation, and if he can copy at all it is only

Written to Dictation.

Receipts  
Receipts of various returns of Merchandise ~~for~~ state

Copied from print.

Of all the returns of state, the one above is the

FIG. 3 (SLIGHTLY REDUCED).—COPY OF WRITING OF CONDUCTION APHASIA.

very imperfectly by tracing. These symptoms are due to the visual images of words and letters being blotted out.

I am able to hand round for your inspection specimens of the writing (fig. 1) of a case of pictorial visual aphasia I had recently under my care in Leith Hospital.

He was a young man who, I believe, had pachymeningitis of a chronic nature, and the aphasic symptoms enabled me to state pretty definitely that the lesion was cortical and not in the substance of the cerebrum.

He could hear and understand words perfectly, could speak, but could not read either aloud or in silence. His voluntary writing was very imperfect. He could not write to dictation, and he copied very imperfectly, and only by tracing the shape of the letters, those of simple form being better traced than the more complicated. This is shown very distinctly in his attempts at copying the word "North" as printed and written. He could copy printed type better than manuscript, and could not copy print into written letters. This is a point I shall refer to later.

In supra-pictorial visual aphasia, the patient is probably not able to write voluntarily nor to dictation, and will only be able to trace as a drawing. This is a form of which, I believe, I have at present a case described elsewhere.<sup>1</sup>

III. In motor aphasia, if the lesion is infra-pictorial or subcortical, there is no disturbance of writing. Probably very few organic lesions of this variety have been recorded, most of those claimed to belong to this group being purely dysarthrias and not aphasias at all, but the functional form is well known under the name of hysterical mutism. In this condition, whilst the patients can't speak, they can write voluntarily, can write to dictation, and can copy.

In pictorial or cortical motor aphasia (Broca's aphasia), the patient has agraphia in voluntary writing, and also writing to dictation. He can only copy by tracing. These cases are often met with, and the agraphia has been long known as a symptom of Broca's aphasia. In supra-pictorial motor aphasia, the patient has agraphia in voluntary writing, but not in writing to dictation, and he can copy.

IV. In conduction aphasias (Leitungsaphasie of Wernicke) the patient can usually write, that is, form the words,

<sup>1</sup> Elder. "Aphasia and the Cerebral Speech Mechanism." In the Press.



letters, etc., voluntarily and to dictation ; but he shows paraphasia, he writes the wrong word and letters, and often repeats the same word or letter in writing, just as he uses the incorrect word, and repeats the same word over and over again in speaking.

This tendency to repeat words is sometimes called "word-intoxication." In this form the patient usually copies perfectly.

A case I had some time ago showed these symptoms very markedly.

He was a man who was gradually attacked by aphasic symptoms. His chief symptoms were paraphasia, paraphasia, amnesia verbalis and articulative amnesia. He could speak, but used the wrong words sometimes ; occasionally a wrong syllable or letter in the proper word, and repeated the same word over and over again. He could read, and understand what he read, and he could hear and understand what was said to him. Towards the end of his life, however, the auditory word-centre became involved, probably from a spreading of the disease which was believed to be either of the nature of acute softening or a cerebral tumour. His writing was frequently tested, and I am able to show you copies of some specimens of it (fig. 2). As you will see, paraphasia and word-intoxication in writing were the most marked symptoms of his voluntary writing, and also his writing to dictation. He was asked to give an account of his illness in writing, and the two copies under volitional writing were his two attempts. As will be seen, incorrect words were written, and the same words appeared several times. "About fortnight" appears twice in the first attempt, and once in the second. The word "next" appears three times in the second attempt. He was asked to write to dictation :—Dear Sir,—I beg to acknowledge receipt of your letter of yesterday's date. Several of the words were incorrectly written. He could, on the other hand, copy perfectly from print.

His case was a good example of conduction aphasia of the inter-pictorial auditory motor variety.

#### NOTES IN EXPLANATION OF THE PLATES.

FIG. 1. Note paraphasia in volitional writing and writing to dictation. It shows also "letter and familiar word-intoxication," parts of his signature appearing in at least three of the examples (automatic action of graphic centre). Note also copying by tracing.

FIG. 2. Note paraphasia and *word*-intoxication. He wrote correctly the paraphasic word—owing to connections of graphic with Broca's centre being intact.

FIG. 3. Note paraphasia in his writing to dictation, whereas he could copy intelligently—that is to say, he could copy print into manuscript letters.

Is there any evidence to show that there have been cases of agraphia other than those due to lesions of the speech centres and fibres already considered? A careful examination of the cases and facts produced by Exner,<sup>1</sup> Déjerine,<sup>2</sup> Henschen,<sup>3</sup> Bar,<sup>4</sup> J. B. Charcot et Dutil,<sup>5</sup> Balzer,<sup>6</sup> Schaw,<sup>7</sup> Pitres,<sup>8</sup> Gombault and Philippe,<sup>9</sup> Kostenitsche,<sup>10</sup> Guido Banti,<sup>11</sup> and Wernicke,<sup>12</sup> as well as many others, leads one to the conclusion that no convincing evidence of a special graphic centre can be found by a study of the cases recorded in medical literature. That being so, what evidence can be got from a theoretical study of the subject of writing? In learning to write the individual simply traces the lines as he sees them before him in the copy, but through practice he becomes more expert in the particular movements necessary to form the letters and their combinations into words. When writing is done from memory voluntarily and to dictation, the visual images of the letters are raised in the visual memory, and to a great extent the writing is traced from the copy perceived in the visual memory, just as it would be if the copy were placed before the eyes. On this theory, then, the movements of the hand in writing are directed or guided by the word-seeing centre; in other words, the cell grouping in the centres for the hand and fingers is directed, or co-ordinated, from the word-seeing centre in the left angular gyrus. But whilst this may be so for the ordinary outlines of letters, there is, however, something more than this in the individual who has been trained to write. Where are stored the memories for the fine movements and delicate touches

<sup>1</sup> Exner, "Untersuchungen über die Localisation der Functionen in der Grosshirnrinde des Menschen," 1881. <sup>2</sup> Déjerine, "Memor. de la Soc. de Biol., Paris," 1891-92. <sup>3</sup> Henschen, "Klinis. und Anat. Beiträge zur Pathol. des Gehirns," p. 273; Upsala, 1890. <sup>4</sup> Bar, *France Médicale*, p. 609, 1876. <sup>5</sup> J. B. Charcot et Dutil, "Mem. de la Soc. de Biol.," p. 129, July 1893. <sup>6</sup> Balzer, *Gazette Médical de Paris*, p. 97, 1881. <sup>7</sup> A. Schaw, *Brit. Med. Jour.*, Feb. 1892, and *Brain*, 1893, p. 449. <sup>8</sup> Pitres, *Revue de Médecine*, 1884, p. 864. <sup>9</sup> Gombault and Philippe, "Archiv. Physiol. et Experimental Medicin.," 1896. <sup>10</sup> Kostenitsche, *Deutsche Zeitschrift für Nervenheilkunde*, bd. iv. <sup>11</sup> Guido Banti, "Afasia e sue forme Lo Sperimentale," 1886, p. 270. <sup>12</sup> Wernicke, "Der Aphasische Symptomen Complex." For more detailed reference to recorded cases, see Elder on "Aphasia and the Cerebral Speech Mechanism."

which produce the peculiar shapes and flourishes in the letters of the expert writer? Why are letters formed so differently by different individuals? Why are little peculiarities in an individual's writing reproduced over and over again, so that there is no mistaking one person's writing for that of another, although we have all learned to write from the same or very similar copy, and always raise much the same visual letter images in our word-seeing centres? We not only are not conscious of raising in the visual memory the particular images of the letters as written by ourselves, but many of us if asked to say how we usually wrote a particular letter, would not be able to tell until we had practically done so by writing it. Where, then, are the movements which produce these delicate lines, etc., guided from? Are they guided from the visual word-centre, or from a special centre in the immediate neighbourhood of the centres for the movements of the hands? I believe that at first writing is done entirely from copy, but that the memories of the muscular movements for writing are stored in the neighbourhood of the motor centres for the hand (what Bastian would call the kinæsthetic centres). Writing, it must be remembered, is only one of the many of the different accomplishments for which the hand can become specialised, and the same muscles are used for all of them although in different combinations. Take, for instance, the very delicate movements of the musician playing such a musical instrument as a piano, a mandoline, or a violin, or let us take the movements necessary for expert typewriting, the movements necessary for painting, the movements necessary for the handling of a club by a golfer, or the cue by a billiard player, or the movements necessary for the doing of any work by a skilled workman. Are not impressions of these skilled movements conveyed by the tactile nerves, and the nerves of the muscular sense, to the nerve cells in the cortex to be there stored in the memory to be reproduced again when necessary? Is it not reasonable to suppose that certain cells get specialised for the storing up of the memories of these special movements so that they can be reproduced at will, and is it not reasonable to suppose that these cells act by bringing about the necessary cell grouping in the motor centres for the particular part of the body, where the particular muscular movements are produced? On this theory, then, there are certain specialised centres in the neighbourhood

of the motor centres for the hand, and one of these specialised centres is that for writing.

If for a moment one considers all the movements necessary for writing, and if it be granted that a nerve centre varies in size in direct ratio to the number of combinations necessary to produce the movements for which it has become specialised, then the graphic centre need not necessarily be a large one in order to produce all the letters and figures and all their combinations. It is not necessary to have stored in a graphic centre the memories of the graphic images of *words* because we do not write words as words. We write letters and combine them so that words are produced. All that is necessary, therefore, is to have the graphic images of all the letters in their capital and small forms, and all the figures and other signs used in writing, and the graphic images of the appendages to the letters and figures, such as the lines connecting them, special flourishes, etc. The graphic centre is enabled to combine these letters into words by means of the psycho-motor speech-centre, and the auditory word-centre, because, as we can easily test on ourselves, when we write there is a process of silent articulation always going on, the articulatory image, as well as probably the sound image of the letter and word, being raised in the cerebrum. Hence the necessity of having both the psycho-motor and also the auditory word-centre unaffected if correct writing is to be produced. This is the reason that a cortical motor aphasia almost, if not always, produces agraphia.

I do not intend here to enter fully into a discussion of the question as to which of the speech-centres takes the foremost place in the act of spelling correctly, although it has a very distinct bearing on this question of writing. Some hold that the visual centres are chiefly concerned in spelling correctly, but whilst this may be so in some individuals, I think in most cases the most necessary centres for correct spelling are, 1st, the articulatory motor centres, and 2nd, the auditory. When we are asked to spell a word such as "picture," we at once raise first the syllable sound-memories in the auditory word-centre, and then are able to pronounce in succession and in their proper sequence the letters which compose the syllables and the word as a whole. This is why a child, when learning to spell, articulates the letters in their proper sequence over and over again. The psycho-motor memories are raised at once in the cerebrum,

whilst although the visual memories of the letters and words may also be raised in many cases, they are very imperfectly raised. I think this is very clearly shown by the fact that it is with difficulty we can spell words backwards. If the visual memories were first and distinctly raised, we would be able to spell words and syllables easily backwards, as we would mentally see them. I am aware that the visual memory is often used in order to correct words if badly spelt. Many people, if in doubt as to the spelling of a word, write it down to see how it looks. If one considers, therefore, that only the letter graphic memories, and probably also the graphic memories of very familiar small words and syllables and familiar words such as the signature, can be stored in the graphic centre, the spelling and combining into words being accomplished by the other centres and chiefly by the psycho-motor articulatory centre, it will at once be seen that there are not very many graphic image memories required altogether. We are all in the habit of writing each letter in a particular form, and if we wish to change that form we at once call in the help of the visual centre in a very decided manner, and trace the new form of the letter as we would from a copy. Take even our attempt to print with a pen or pencil all the letters of the alphabet, or our attempts to write the letters of a language whose letters are unfamiliar to us. We simply trace them as we would a map or design. If we have not the form of the letters in a copy before our eyes, we raise them in the visual memory, and we mentally see them. And not only can we write letters of any language or any shape by simply tracing them in this way with the right hand, but we can do the same thing by means of the left hand, although not quite so well as with the right.

The only difference is that our right hand is used for almost every action, and the movements of the right hand are more under the control of the will and better co-ordinated than those of the left, from more constant use, and from the fact that it is trained to hold a pen and to draw lines, curves, etc., although not the exact form of the strange letter it is attempting to write. Although such letter as a whole is strange, parts of it are familiar, so that the right hand which is accustomed to draw lines, etc., is more expert at the new letter than the left, but the expertness with which the letter is written is a long way behind the expertness with which a familiar letter is written.

Not only can letters be traced as from a copy by the left hand, but the same thing can be done by a pen between the teeth, by one attached to the leg or the elbow. This, I believe, is brought about by the guidance or direction of the visual centres where are stored the memories of the forms, shapes, etc., of objects.

But how different is this from writing! Is there much resemblance between the writing as written by the right hand, and that written by the left?

If one knew a man's handwriting, as, for instance, his signature, would it be possible to tell his signature if written with his left hand instead of his right hand? And yet he has got the same muscles in the left hand as in the right, and has got the same visual centres to guide it. There would probably be slight resemblances, but this would result merely from having the form and shape of the letters of his signature in his visual memory when he was tracing it.

About this question of left-hand writing, I think there has been a considerable amount of misconception and false reasoning. When Wernicke pointed out that the left hand could be used for writing, as well as many other parts of the body (in fact, any part which could be moved and to which a pen could be attached), and that such writing was undoubtedly guided or directed from the visual centres, too much importance, I think, was put on those facts. As I have pointed out, such writing is only tracing and not writing in the true sense of the word, and not only so, but if the question be carefully considered, it will be seen that if we take for granted that there is a true special graphic centre in the left cerebral cortex which co-ordinates or guides the movements necessary for writing with the right hand, and we now consider how such a centre would act if it was suddenly called on to co-ordinate or guide the movements of the left hand in writing, it will be seen that the left hand would not write in the same way as the right. The left hand would write in the peculiar way known as "mirror-writing." Mirror-writing, as is well known, is writing that can be read in a mirror. It is written from right to left instead of from left to right.

The left hand, I hold, would write from right to left if guided entirely by the writing centre in the left hemisphere, and why? Because if the same muscles (that is, the

homonomous muscles) were called into action, and in the same manner in the left hand as they would have been if the impulses had passed to the motor centres for the movements of the right hand, then the left hand would move in the opposite direction from the right, in its relation to the mesial line of the body, that is, all movements from side to side would be in an opposite direction whilst antero-posterior movements would be in the same. In other words, adduction movements on the right side are in the opposite direction to adduction movements on the left, and abduction on the right to abduction on the left. One can easily test on oneself how much more easy it is to move the different parts of the two hands by acting on the homonomous muscles in the same manner than it is to act on heteronomous muscles. Take the mere act of twirling the thumbs in the same direction, an easy performance either when twirled in one direction or the other, provided they both go in the same direction, and the much more difficult feat of twirling the thumbs in opposite directions. The fact is, although the two hands act quite independently of each other and are as near to unilateral representation in the cortex as any part of the body, it is easier for them to act in the same way, more especially in movements very similar to each other than act against each other, a fact which I take as being slightly analogous to the complete bilateral representation which we find in some muscles (as the masseter muscles and the adductors of the vocal cords) which act always together and which can only be completely paralysed by central lesions when they are in both hemispheres. The muscles of the face take a place midway between such muscles as those for adduction of the vocal cords and muscles, such as those of the hand we are considering, and therefore are partially bilaterally represented, and are paresed but not paralysed by a single lesion in their cortical centres or tracts from the centres.

This bilateral representation is brought about, it is believed, by commissural fibres joining the centres through the corpus callosum. In all probability, therefore, there are commissural fibres joining the centres for the hand. Although these fibres are not sufficient to innervate both sides, they probably act sufficiently to make it easier to move homonomous muscles in the same than in the opposite direction. I repeat, therefore, that one would expect mirror-writing if the left hand

was used for writing and was guided by a special graphic centre on the left side.

Patients who, when they get paralysed on the right side, learn to write with the left hand, therefore require to call in the visual centres to guide the left hand in writing and therefore left-handed writing in the usual form is directed at first by the visual centres. Through practice, however, the left hand gets more expert at writing and a special graphic centre gets specialised on the right side for expert left-hand writing just in the same way as on the left for expert right-hand writing.

It has been noticed that mirror-writing is sometimes shown by some patients who have to write with the left hand, and some, it is said, have not been aware of their peculiarity.

This, of course, must have been due to some want of intelligence in the patient, although I must say, however, that I have been struck with the fact that some mirror-writers did not perceive that they had written the wrong way until they had finished their signature, for instance. With the view of testing the question as to whether some people would naturally write in the mirror fashion if asked to write with the left hand, I asked those whom I came in contact with, in Hospital and elsewhere, to write their names with their left hand, and I very soon found that a certain proportion of people wrote in the mirror fashion. Some of these cases, when being tested, were very interesting in the way they went about it. Several took the pen in the left hand, put it down to the paper near the left edge, commenced to write and very soon found that they went over the edge of the paper. One girl, after doing this, hesitated for a few seconds, shook her head and then began at the right side of the sheet. None of the cases, I may say, knew what they were being tested for. I have only noted as being mirror-writers those who commenced of their own free will to write in the mirror fashion. Many more, however, could write as well in one way as the other.<sup>1</sup>

<sup>1</sup> For help in testing many of these cases, I am indebted to Nurses Duckworth, Vass and Burnet, Leith Hospital, and for many of the others, to Miss M'Intosh and Mr Porteous.



## RESULTS OF TEST OF WRITING WITH THE LEFT HAND.

	Total Number.	Females.	Males.	Ordinary Writers.			Mirror-Writers.			Percentage of		
				Total.	Females.	Males.	Total.	Females.	Males.	Mirror-Writers.	Female Mirror-Writers.	Male Mirror-Writers.
Over 15 years of age .	154	95	59	138	81	57	16	14	2	10.39	14.73	3.39
Under 15 years of age .	297	242	55	290	237	53	7	5	2	2.35	2.06	3.63
Total . . .	451	337	114	428	318	110	23	19	4	5.1	5.63	3.5

These facts show to my mind that there are a certain proportion of mirror-writers, and I believe that the reason of it is to be found in the theories I have propounded. What lends

Fig. 4.—Specimen of mirror-writing which can either be read in front of a mirror or through the paper. Compare it with the right-hand writing of the same individual in Fig. 5. Note the singular resemblances between the letters and words of the one and the other, showing that probably the same graphic centre guided both hands.

support to this is the fact that whilst it can't be said that the most expert and best writers were mirror-writers, still only those were mirror-writers who had been well educated. I found none of the poor hospital patients, who had had little education and less practice in writing, mirror-writers, their visual centres probably took too prominent a part in the guiding of the hand in writing. Some of the nurses and some of the well-educated and better class patients were the mirror-writers, and only those were found to be mirror-writers who had had considerable practice in writing.

As will be seen, I have divided the persons tested into those above fifteen years of age and those below fifteen years of age. I expected that if my theory was correct that the proportion of mirror-writers above fifteen would be greater than

those below fifteen, for the simple reason that those over fifteen years of age have had more practice in writing, and do not call in the visual centres so markedly as boys and girls under fifteen years of age, who are at the stage of their education when they use the visual centres to trace the outlines of letters, and are always trying to write the letters correctly. They have not developed the free and easy style of writing of the adult; in other words, the special graphic centre has not yet been sufficiently developed to write mirror-writing with the left hand *in spite of* the visual centre, as it is to be remembered that the visual centre would naturally lead a person to write in the usual way. Another proof of the fact that mirror-writing with the left hand is guided from the same centre as ordinary writing with the right is furnished by a comparison of the mirror writing with the same individual's right-hand writing. If the one

*Note.*—Mirror-writing of Fig. 4 is seen in this space through the paper.

*This is written with the  
right hand*

FIG. 5.—RIGHT-HAND WRITING.

is held before a mirror or looked at through the paper and compared with the right-hand writing, it will be seen that there is no mistaking that the handwriting is the same—every detail of the ordinary writing appearing in the mirror-writing. Fig. 4 is an example of mirror-writing, and if it be compared with the right-hand writing of the same patient (fig. 5), one cannot but conclude that the two hands are guided from the same centre.

The fact is, we are forced to the conclusion that there must

be stored in or in the neighbourhood of the cortical centres, for the movements of the right hand, special cells whose function it is to do the cell grouping or co-ordinating of the movements necessary for writing in the true sense of the word. These cells form, therefore, the psycho-motor graphic or the special graphic centre, but the area where they are need not necessarily be anatomically separable from the centre for the hand, so that it is quite possible that no pathological lesion could blot out those cells and at the same time leave the ordinary motor centres for the hand intact. The fact that no really well-authenticated case has been produced where it could be said with certainty that the psycho-motor graphic cells were alone involved, shows that in all probability these cells are not pathologically separable from the centres for the movements of the hand in the middle of the ascending frontal and ascending parietal convolutions. The position the graphic centre has usually been considered to be located in, is a little further forward, viz., in the adjoining part of the second left frontal convolution.

It will be well, however, for clinical observers to remember that if this graphic centre was alone involved, without the movements of the hand being involved and without the visual word-centre being involved, *there would not be loss of the power of writing*. Writing could still be performed, just as we are able to write with the left hand, or with our foot; in other words, the patient would be able to trace letters and words, but what would be lost would be the power to write in his *usual handwriting and in a rapid and expert manner*.

This fact has not been sufficiently borne in mind by clinical observers, so that we constantly see notes taken as to whether a patient was able to write or not, without paying particular attention as to whether he wrote in his usual handwriting or not.

A practical test for this would be to ask the patient first to print a sentence and then to write a sentence. It would be found that probably he would be able to print the letters better than he could write them. This results from the fact that letters as used in print are more distinct in their outlines, more easily raised in the visual memory and more easily copied as one would a drawing, than letters as written. The movements necessary for their production are not so intricate and complicated as those for writing, the lines being straighter. I refer here to plain Roman printing type.

This fact I have noticed very distinctly in cases with agraphia due to word-blindness, as in fig. 1, where there was a very considerable difference in the facility with which the patient copied plain printing from the difficulty with which he copied manuscript, especially if the letters had any appendages, flourishes, or any little peculiarity of form. In attempting to copy the word North as written, he looked long at the loop on the N, and then made several attempts to write it. He seemed in great difficulty as to how it was to be added to the rest of the N.

This, I think, is brought out by a study of his writing, fig. 1. Normally we all write manuscript letters more easily and better than we draw printed letters, whilst in graphic disturbances whether from lesion of the visual word-centre, or graphic centre, we draw printed more easily and better than manuscript letters. Pitres says that visual aphasia cases cannot copy at all, whilst true agraphias can. I think, however, that many visual aphasias see sufficient of the forms of letters to be able to trace them.

In a former part of this paper I theoretically sketched three different forms of each type of aphasia, viz.: infra-pictorial, pictorial and supra-pictorial. As I have now stated, no true authenticated case of graphic aphasia verified by a *post-mortem* has been published, but many cases have been claimed as graphic aphasias. Granted that there is a special graphic centre, theoretically we might have: (1) supra-pictorial graphic aphasia; (2) pictorial graphic aphasia; (3) infra-pictorial graphic aphasia.

No case has been claimed to belong to any but the second variety. There is little doubt that a lesion which destroys all the centres for the movements of the hand, the specialised as well as the ordinary motor centres, that is, a cortical lesion producing paralysis of the right hand, can be scientifically considered to be a case of graphic aphasia. Although all the movements of the hand, as well as the movements necessary for writing, are rendered impossible, still the patient, looked at from the aphasic point of view, suffers from agraphia. If the lesion existed independently of the true graphic centre, he would have infra-pictorial agraphia; if the true graphic centre was also destroyed, he would have pictorial agraphia. He is probably able to write with the left hand, but the writing is



simply by tracing or copying, until he gradually educates the right hemisphere and specialises another centre there. There are, therefore, many such cases of agraphia if these cases be accepted as agraphias, but, as I have said, there are none in medical literature where the centres for the ordinary movements of the hands escaped, and the graphic centre alone, or the connecting fibres from it to the centres for the hand, were involved in a lesion. But there is another class of case which, I believe, belongs to the first variety, and of this class the case of Pitres,<sup>1</sup> which I have previously referred to, may be taken as an example. It was, I believe, a case of supra-pictorial graphic aphasia, that is, a lesion in the fibres between the psycho-motor speech centre, and the psycho-motor graphic centre, and not a lesion of the graphic centre alone, as Pitres claimed.

A lesion in this position theoretically must occasionally occur, whether we hold there is a true graphic centre or only a centre for the movements of the hand, and the existence of this lesion probably accounts for those cases of motor aphasia with agraphia, in which the latter symptom persists after the patient has recovered from the motor aphasia.

These cases are not considered by Déjerine to be true agraphia cases, but to be simply the remains of the motor aphasia. I think, however, that theoretically as well as clinically they can be truly classed as supra-pictorial graphic aphasias. The following is a very interesting case of this sort. He was at first a case of pictorial motor aphasia with agraphia, but the motor aphasia soon disappeared, and he remained agraphic.

*Personal Observation—Motor Aphasia with Agraphia—rapid recovery of Motor Aphasia. Agraphia persistent.*

T. D., æt. fifty-nine, admitted to Leith Hospital, October 15th, 1896, with complete loss of speech. Two or three days before admission he had suddenly lost his speech. On admission he was found to have no paralysis either of the face or of the limbs. Pupils equal semi-contracted, re-acted to light and accommodation. Hearing all right, eyesight hypermetropic. He could scarcely speak a word; occasionally in answer to questions he would say "yes" or "no," "I can't," etc., but with the greatest difficulty, and after apparently considerable distress. He could not tell his name or address. He understood what was said to him, as, for instance, when asked to put out his hand and grasp the doctor's hand, he did it slowly and deliberately. He

<sup>1</sup> Pitres, *loc. cit.*

PUT

PUT

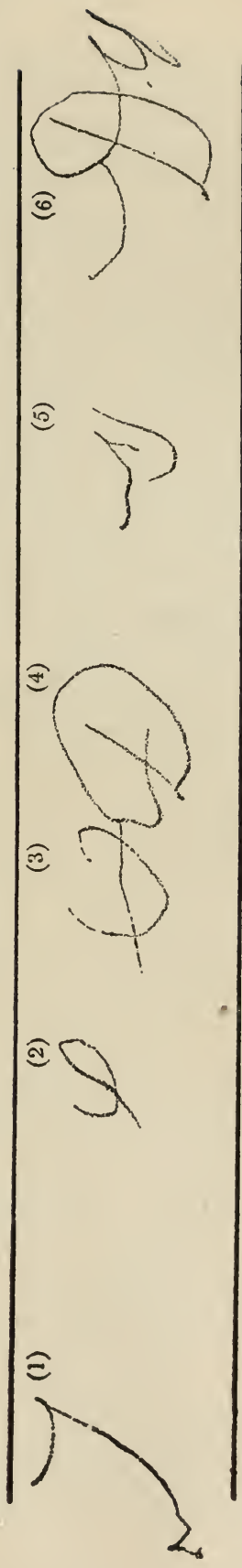


FIG. 7.—ATTEMPT AT COPYING PUT IS SEEN TO THE RIGHT SIDE ; ATTEMPT AT WRITING TO DICTATION OF 1 2 3 4 5 6 IS SEEN BELOW EACH NUMBER.

could not read; when the words "Put out your tongue" were written he apparently did not understand them. When 1 2 3 were written he could not say one, but said two and three with difficulty. On A B C being shown to him he called B *three*, but gave no answer to A and C. This was an example of what he frequently did in subsequent examinations—after he pronounced one word the same word was given in answer to subsequent questions (word-intoxication). He was tested as to his writing, and specimens of it are shown in fig. 6. When asked to write his name it was seen that he began the T all right, but he often produced several T's in succession; on several occasions four to six successive T's were written. The same thing was shown on writing to dictation and to copy. (This is a form of paraphasia and "letter-intoxication" in writing.) After he had got the first letter D of his surname he usually wrote the rest of the name rapidly, and, as it were, automatically—"very familiar word-intoxication." This is seen in fig. 6, where he was asked to write his name. In fig. 7 he was asked to write 1 2 3 4 5 6 to dictation, and the result was that he wrote T for 1, an attempt at T for 2, and an attempt at T for 3, D for 4, T for 5, and wrote Du for 6. When asked to copy PUT he wrote six T's in succession.

On the 16th October it was noted that improvement in his speech began on the night before, and that it was still better in the morning. He could now tell his name and address correctly. Said he felt better, put out his tongue and shook hands more promptly when asked. Spoke still with evident effort, but more distinctly. Asked how he was. Said, "Mending a bit." Could tell the day of the week, named all the days of the week in order, and the numbers up to ten. No difficulty shown in the mere pronunciation of these, but hesitancy in recalling how they should be pronounced. His reading was tested, and it was found that he could read aloud some words, as, for instance, "Lord" and "Thy" from a book. The words "Give me your hand" were then written down, and he said they were "Lord" "Thy" "Lord." The figures 1 2 3 were then written down, and he was asked what each was separately. He said 1 was "Lo," 2 was "Lo," 3 was "three," 4 was "four." He was now asked what 1 was, and he said "one," and 2 he called "two." On being asked again, what 1 was, he said "two," 2 he said "three, isn't it?" 3 he called "three," 4 he called "three," 1 he called "three." In a final attempt he named them "one, two, three, four." The word Thomas was then written down, and he was asked to name each letter in turn. He said, "three" "h" "nothing" "m" "four" "n." On the S being pointed to, and asked if it was N, he said "No." "Is it P?" He said "No." "Is it S?" He said "That's S." His writing showed some characteristics as in fig. 6.

19th October.—He felt better. Could speak fairly well, but had slight hesitancy between the words. On spelling over words to him he could tell what they were. He also could spell words pronounced to him, and said he could read now well, although he could not do so a few days ago. From the day of his admission he never used signs to indicate what he meant, but he now used his muscles of expression and his hands to indicate his meaning. When asked about this, he said that he never thought about using signs, and thought he must not have been able to use them, or he would certainly have done so.

20th October.—His writing had somewhat improved, and it was also



noted that in copying he was able to convert printed letters into manuscript letters, showing that it was not merely done as a tracing, but the letters reached his intelligence.

*3rd November.*—He left the Hospital, speaking as he usually did, but in much the same condition as regards his writing. He was asked to come back on 9th November, when his speech was found to be normal, and he could read slowly. It was seen that his writing had improved somewhat since he went out of the Hospital.

This, as will be seen, was one of those cases of motor aphasia with agràphia, in which the motor aphasia rapidly disappeared and the agràphia remained. I believe that those cases are due to Broca's convolution recovering, whilst the fibres from Broca's convolution to the graphic centre or centres for the hand remain involved, that they are, in fact, cases of supra-pictorial graphic aphasia. This case at first had certainly impairment of his ability to read, but whether this was entirely due to his motor aphasia, or whether there was not also some cortical word-blindness, one could not definitely say. I believe that he could not read, because he could not recall the articulatory images of the words, as they are very necessary, as I have previously pointed out, for reading. The fact that he could read when he recovered his speech, rather tends to show that the difficulty in reading was all due to the motor aphasia. In that case, the visual word-centre had nothing to do with his agràphia, and the fact that in copying when recovering he was able to convert printed letters into manuscript letters also favoured the view, although at the very beginning of his illness his agràphia was so complete that he could not write his signature, and he showed paraphrègia and letter and word-intoxication so much, that his graphic centre for the first few days could do nothing more than write his signature, and often repeated the letter "T" over and over again in the same monotonous shape. The case is also of very great interest from being such a complete motor aphasia of the pictorial variety, but one which was very temporary in duration. His case suggested at first toxæmia as a cause, but there was no albuminuria, and the further progress of the case showed that it was more probably organic in origin.

Is it possible from the writing alone to make a diagnosis as to what part of the cerebral speech mechanism is affected by an aphasic lesion? I believe that in most cases it is. If the lesion cuts off the graphic centre from the psycho-motor articulatory centre, as in this last case, then the patient is only able to write letters singly, or very familiar words, such as his signature. The

writing will also show *letter-intoxication* very markedly. An example of this is seen in fig. 6. If the psycho-motor articulatory centre is also involved, the same graphic symptoms result; but, of course, the patient has also motor aphasia. If the lesion cuts off the psycho-motor articulatory, and the graphic centre from the auditory centre, the patient shows *paragraphia* of words as well as letters, and shows *word-intoxication*. That results because the graphic centre is enabled to combine letters into words through the agency of the psycho-motor articulatory centre. An example of this is seen in the specimens of writing of the conduction aphasia case (figs. 2 and 3).

In auditory aphasia the same kind of writing appears as in conduction aphasia; but, of course, the patient is word deaf, and cannot write to dictation. He also shows *amnesia verbalis*.

In lesion of the visual word-centre, the patient shows more marked disturbances of writing than in the other forms, as he is not able to see letters, and cannot recall the images of letters. If he is able to write at all, he makes letters with incorrect lines and incorrect shapes. He cannot copy print into manuscript, and he does not know whether he has written correctly or not. If the lesion is an *infra-pictorial* visual aphasia, he is able to write voluntarily and to dictation, but not able to copy perfectly.

The conclusions we are now able to draw from a study of the whole subject of *agraphia* are these:—

1st. That *agraphia* and disorders of writing may be symptoms of any of the types of aphasia.

2nd. That there have been no true *agraphias* proved by a *post-mortem* examination to be due to the destruction of a special graphic centre.

3rd. That if cases of paralysis of the right hand be considered as *agraphias*, then many *post-mortems* have shown that the centres for the hand are in the middle of the ascending frontal and ascending parietal convolution.

4th. That the fact that no authenticated case of *agraphia*, pure and simple, verified by *post-mortem* examination, has been recorded, tends to show that if there is a graphic centre, it is not pathologically separable from the centres for the hand.

5th. That the cases on record where *agraphia* remained after return of speech in motor aphasia, are probably due to lesion in the fibres joining the psycho-motor articulatory centre to the graphic centre or centres for the hand.

6th. That a theoretical study of writing, as well as a study of mirror-writing, tends strongly to the conclusion that there is a special graphic centre in the left cerebral cortex.

## Meeting V.—February 3, 1897

DR WILLIAM CRAIG, *Vice-President, in the Chair*

## I. EXHIBITION OF INSTRUMENT

Dr Graham Brown exhibited the Perigraph, an instrument for delineating the shape of the thorax, and for clinical mensuration generally.

## II. ORIGINAL COMMUNICATIONS

## I. THE PERIGRAPH :

## AN INSTRUMENT FOR DELINEATING THE SHAPE OF THE THORAX AND FOR CLINICAL MENSURATION GENERALLY

By J. J. GRAHAM BROWN, M.D., F.R.C.P. Ed., Lecturer on the Principles and Practice of Medicine in the Edinburgh School of Medicine

IN view of the fact that the outline tracings of the shape of the thorax as made by the cyrtometer are apt to be inaccurate, it occurred to the author that some better manner of making such outlines ought to be at the command of the clinician, and, as the result of some consideration, the following method was devised. It depends on the principle of parallel motion, that which underlies all forms of pantograph, and which was first employed, as a means of copying curves, by Watt, of the steam-engine, who in his declining years amused himself by constructing and using such an apparatus.

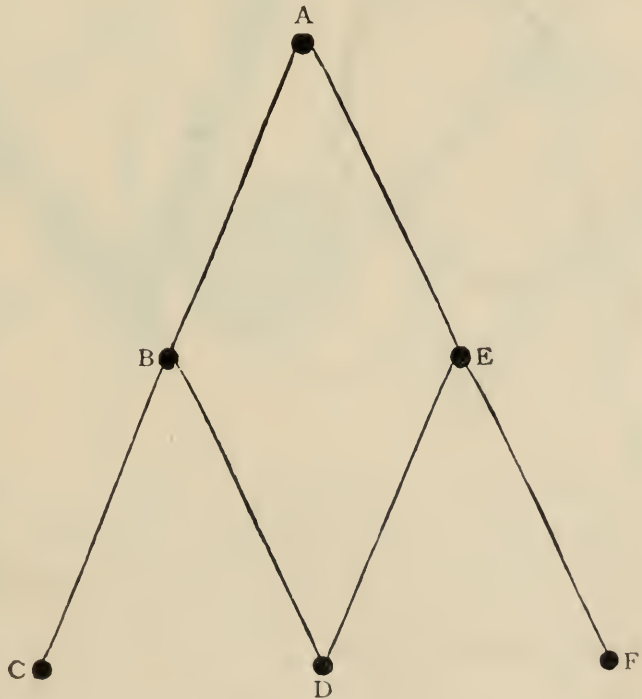


FIG. 1.

The ordinary form of the pantograph may be gathered from

Fig. 1, where, if *F* be a fixed point round which the rods may turn, then, when a style fixed in *C* is moved over a drawing, a pencil in *D* will delineate a copy, which, when the relative lengths of the rods are as represented in the diagram, would be half the natural size.

It is quite clear, however, that to make this principle of use in delineating the shape of the thorax, some considerable

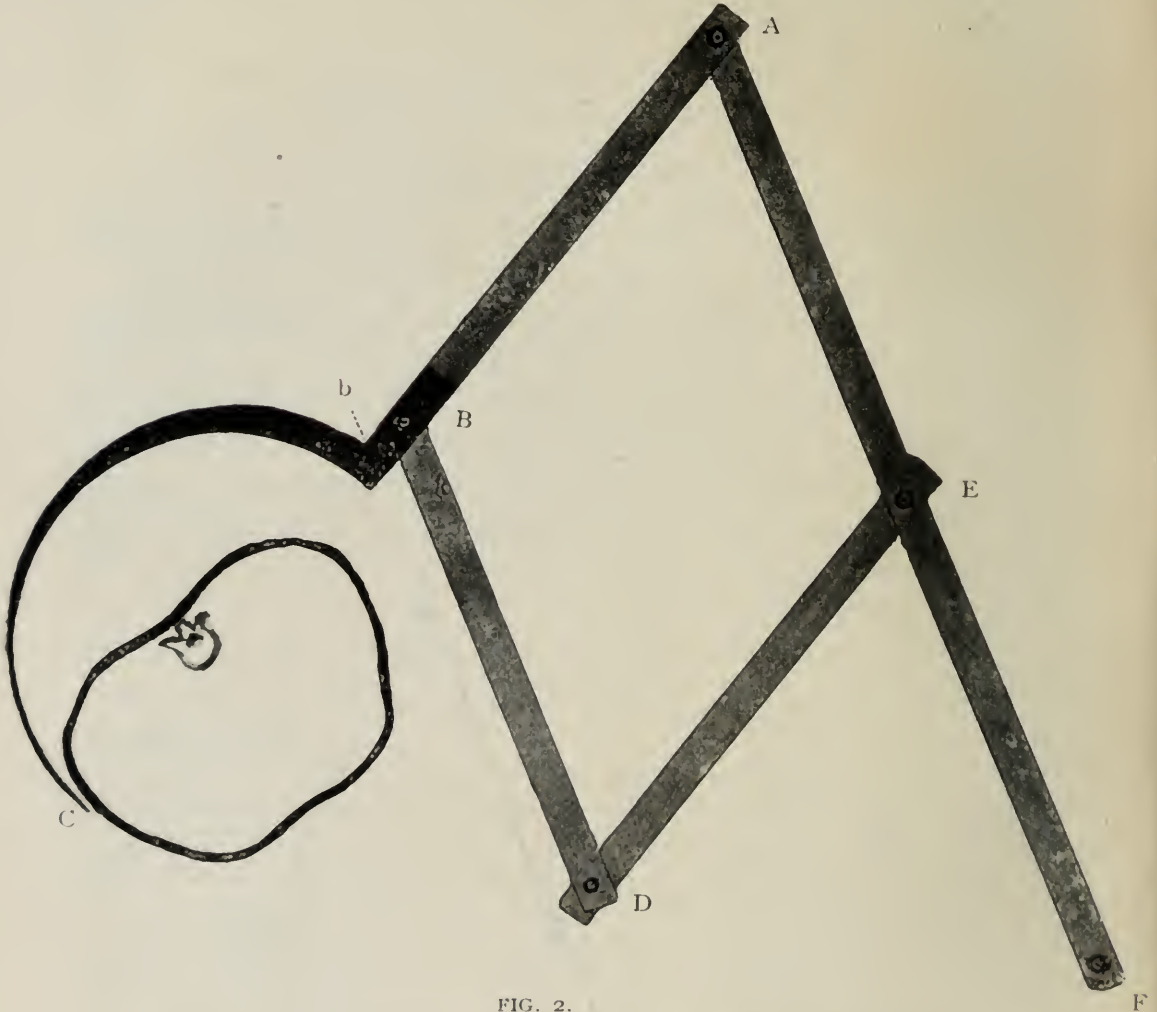


FIG. 2.

modification is necessary in order to enable the point *C* to move round a more or less cylindrical surface, and this result was attained by substituting for the straight portion *B C* a sickle-shaped piece of brass, pivoted at *B* and capable of rotating as will be described.

The instrument, so modified, is shown in Fig. 2. The sickle-shaped portion, constructed of brass, passes from *B* to *C*, and is pivoted at *B* in such a manner that it can be rotated round

that centre through an angle of  $180^\circ$ , while the point C continues to lie in the prolongation of the axis of A B. The point F is fixed, and D bears a pencil which records the motions of the instrument on a sheet of paper placed beneath. Hence, if the point C is made to move round the thorax, the pencil at D will trace the chest form. This instrument the author has named the Perigraph, or round writer.

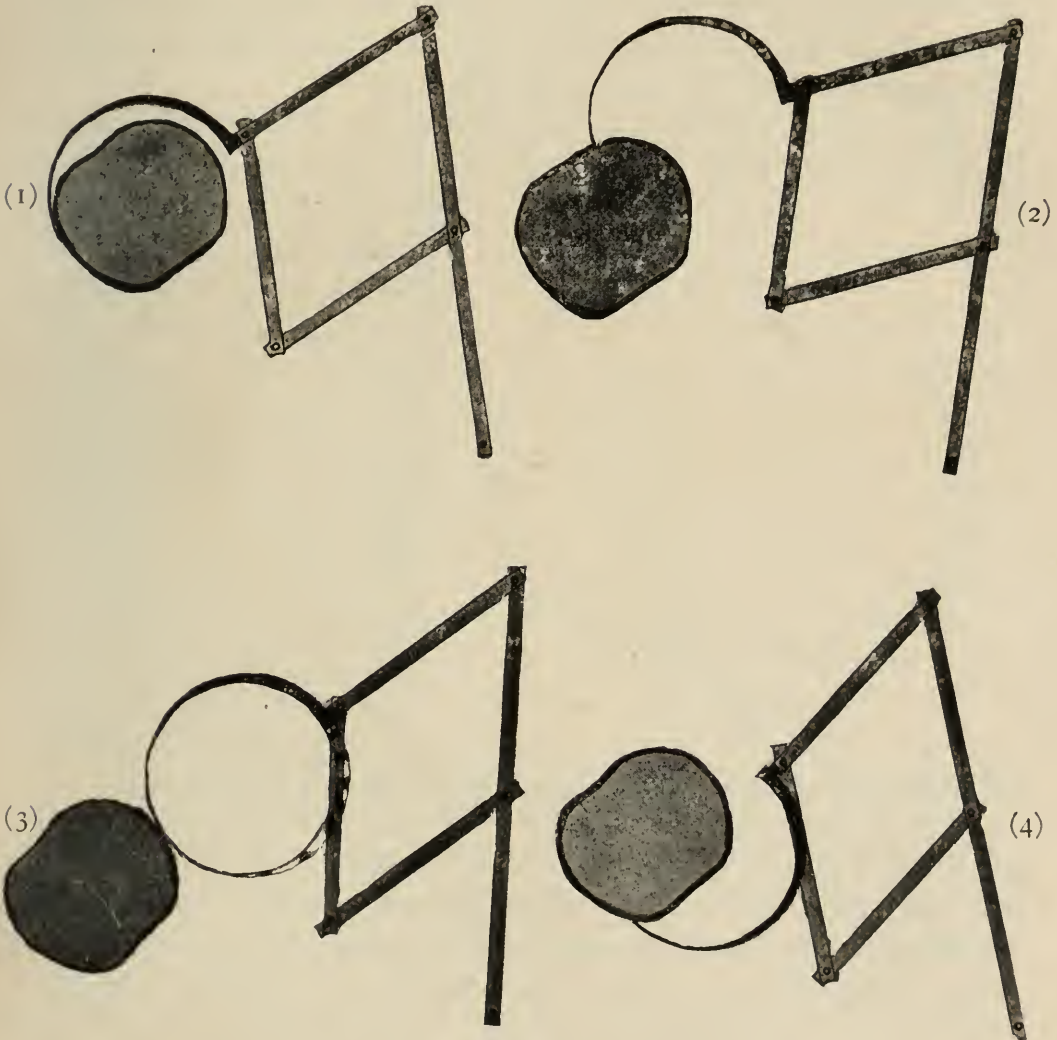


FIG. 3.

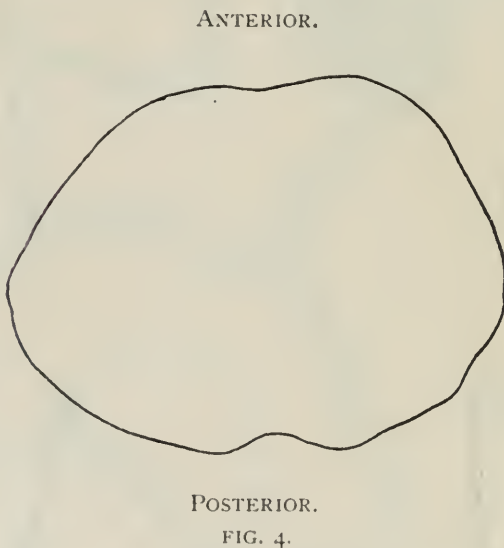
A glance at Fig. 3 will make clear the motion of the perigraph in its various phases as it passes round the wall of the chest. Beginning in the position marked (1), the point is made to sweep over the skin through the position (2), until it reaches, at (3), the point diagonally opposite that at which it commenced. The sickle is then rotated through  $180^\circ$  to assume the position indicated by the dotted lines, and the point is

moved onwards, through (4), until it completes the circumference of the thorax and arrives at the point from which it started.

A reduced diagram of the shape of the thorax in a muscular subject, obtained in this way, is shown in Fig. 4.

The instrumental errors of the perigraph, when the instrument has been carefully constructed, are very small, and may be neglected, seeing that those arising from irregularity in the yielding of the skin and soft parts, and from the movements of the patient are much more apparent.

By varying the relative lengths of the sides of the parallelogram A B D E (in Fig. 2), for which provision is made



in the construction of the instrument, the relation of the size of the drawing to the actual size of the thorax may be varied. By making D the fixed point, and attaching the pencil at F, the tracing obtained will be life size. The author finds that the arrangement depicted in Fig. 2 (where A B, B C, B D, A E, E D, and E F are all equal) is usually

the most convenient, the tracings being then half life size.

Up to this point, it will be observed, the curves obtained by the perigraph are similar to those yielded by the cyrtometer, although their accuracy is much greater than that of tracings obtained by the latter instrument. After the perigraph had been constructed, however, it was found that it was capable of giving outlines of the chest shape, in planes other than the horizontal, at once more interesting and more useful, and such as the cyrtometer could not yield.

If, for example, the patient be made to lie on one side, a tracing of the shape of the abdomen and thorax may be obtained, commencing at Poupart's ligament, and passing upwards in the parasternal line over clavicle and shoulder, and down the corresponding line of the back to the crest of the ilium. Such curves are given in Figs. 5 and 6, the former

from a more muscular subject than the latter. In each case the curve is double, representing the difference, in the abdominal and thoracic outline, in inspiration and in expiration respectively. It may be of interest, in passing, to note the deep in-sinking of the tissues, at the point C, above the clavicle during inspiration.

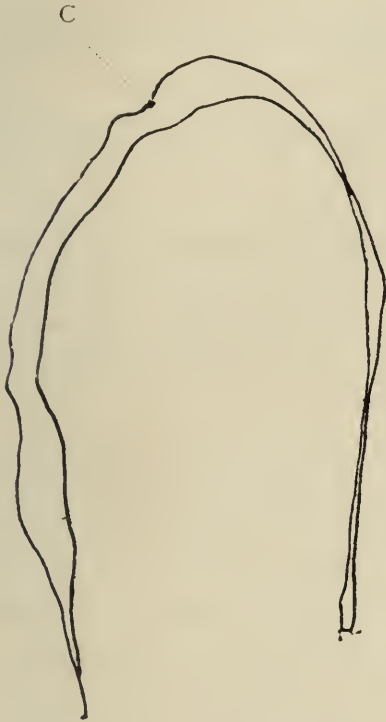


FIG. 5.

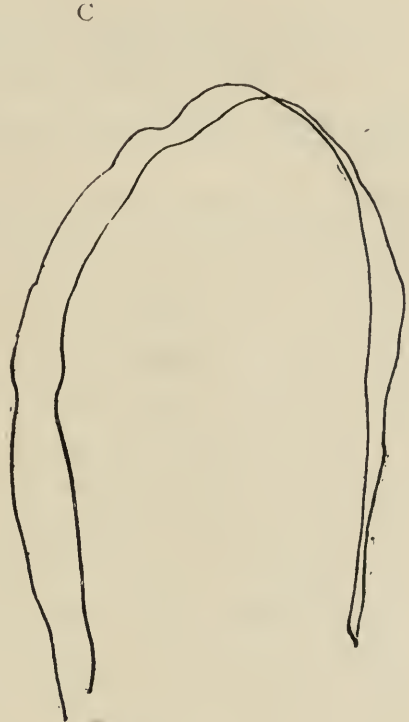


FIG. 6.

The perigraph is applicable to a variety of clinical purposes besides those already mentioned. It has shown itself to be well adapted to furnish tracings of spinal curvatures, both lateral and antero-posterior, and it thus provides a means of estimating the changes produced in the course of disease or the improvement resulting from treatment. The size of tumours may be also recorded and their rate of growth estimated. In observing the growth of Cretins the perigraph may also prove of service.

To show the adaptability of the instrument, there is given, in Fig. 7, a tracing obtained by moving the point of the instru-



FIG. 7.

ment over the head in a sagittal direction, from the nose (*a*) to the occiput (*b*).

The instrument was very carefully made, from the drawings of the author, by Mr A. H. Baird, 37 Lothian Street, Edinburgh.

## 2. DUAL BRAIN ACTION AND ITS RELATION TO CERTAIN EPILEPTIC STATES

By LEWIS C. BRUCE, M.D., Assistant Physician, Royal Edinburgh Asylum

THERE is considerable ambiguity among various writers as to the precise meaning of the term "dual brain action." I regard a typical case as that of an individual who appears to have two separate and distinct states of consciousness, and in whom the right and left brains alternately exert a preponderating influence over the motor functions.

Any asylum physician must see many cases of spurious duality, as, for instance, when a patient affirms he is inhabited by another individual, generally blaming his lodger for all his evil actions; or where a patient will ask questions, and himself answer them with such natural accentuation that a listener might be deluded into the belief that he was overhearing a conversation between two different individuals. Many such cases are regarded and published as cases of dual brain action without there being an iota of proof for the statement. They are the outcome of purely delusional states, and the patient is always in touch with and in full consciousness of his surroundings.

Typical cases are rarely, if ever, seen in health. Most of us believe that in health the two cerebral hemispheres supplement the action of each other in mental and motor activities. In diseased conditions one very occasionally encounters well-marked cases, although partial cases may occur with comparative frequency. My attention was first turned to the matter by having the good fortune to have among the male patients at the Derby Borough Asylum a man who passed through two distinct states, as if he represented two separate individuals. These two states were characterised by many differences, but for convenience they are named the *English stage* and the *Welsh stage*. The case was published in "Brain," Part LXIX.

In the *English stage* he was right-handed and the subject of



chronic mania. He spoke in English, but understood Welsh. He was restless, destructive, and thievish. He wrote, drew pictures of ships, and related incidents of his past life. He recognised the doctors and attendants, but his memory was a blank to anything that occurred in the Welsh stage. He, however, remembered clearly things he had noticed in previous English periods. His writing was peculiar—he wrote with the right hand, writing from left to right; but if asked to do so, he used the left hand, and then wrote backwards from right to left of the paper (mirror writing). Sight, hearing, taste, touch, and smell were acute and unimpaired.

In the *Welsh stage* he was the subject of dementia, left-handed, and spoke exclusively in Welsh. He did not understand English, spoken or written. He was now shy and suspicious, and did not recognise attendants or doctors. Specimens of his handwriting were obtained with difficulty. He always used the left hand, and wrote from left to right of the page. On one occasion he used the right hand, after much persuasion, and traversed the paper from left to right, but made all his capital letters backwards. His special senses were unimpaired, but he no longer was able to analyse and appreciate the crude sensations received. Such a case one does not often see; and as I thought the condition due to the unequal ravages of disease in the two cerebral hemispheres, I examined most of the patients in the asylum with a view to ascertaining if any of them exhibited similar symptoms. A few of the delusional patients showed opposed states, in which the *ego* seemed to be divided against itself, but none presented any of the motor peculiarities which were so striking in the case of the Welshman.

When one sees a delirious patient, in addition to the gross representation received by the senses, the mind's eye brings up a picture of the diseased organs, especially the brain with its distended vessels and arterioles, its irritated and highly-pigmented cells, no longer under the control of the higher centres, but discharging their energy, mental and motor, irregularly, and without purpose. Much the same occurs when one sees an epileptic seizure. When the epileptic seizure is unilateral and of short duration, it may be concluded that the disturbed mental and motor state is largely confined to one cerebral hemisphere, leaving the other in a comparatively

healthy state, a state in which it can discharge its functions.

It was the study of such cases of unilateral epileptic seizures which suggested to me that the peculiar mental state known as epileptic automatism might be due in some instances to the paralysing effect of the seizure on one hemisphere, while the other hemisphere was capable of carrying on a separate mental existence.

E. A., a female patient, aged thirty-two, had for many years suffered from epileptic seizures and epileptic insanity. She was a fairly rational patient when at her best, although greedy and grasping. She had the reputation of being a confirmed beggar, uncertain in her temper, and at times made unprovoked assaults on fellow-patients, nurses, and doctors. These characteristics did not attract particular notice, as all epileptics are more or less irritable, and prone to resort to violence, especially at certain periods of their illness. This patient suffered from three distinct varieties of seizure—*petit mal*, *grand mal* affecting the right side only, and more severe *grand mal*, which gradually involved the left side after the right side was convulsed. One evening I had been speaking to her in the ward, when she appeared to be in her usual condition. I had not taken two steps from her when she gave a slight cry and fell off her seat, being seized by a slight attack of *grand mal* affecting the right side only. The attack was over in about sixty seconds, and consciousness, which never appeared to be completely lost, rapidly returned. After the fit her expression was completely altered, she recognised neither the nurse nor myself, and she jabbered in an angry way like a monkey. She went down to tea accompanied by a nurse and, although the right arm was not paralysed, she became left-handed, raised her cup with her left hand, and ate with her left. After tea she was taken to the infirmary ward, where I again saw her. She was offered a penny and then a shilling, articles which she usually prized highly and knew the value of, but she now manifested no desire to possess herself of them. This condition lasted for about an hour, when she gradually realised her position and surroundings, and acted accordingly. The next seizure I saw occurred some weeks later, was more severe, and affected both sides of the body. After it she was comatose, but when consciousness returned she was, in proportion to her condition, aware of

what was happening about her, and recognised the nurse in charge. There was no tendency to left-handedness and no restless, aimless wandering. In this instance the left hemisphere of the brain recovered as rapidly as the right from the effects of the seizure. After this she had series of ten or twelve fits at a time, and I had no opportunity of again studying the condition after a right-sided seizure. After attacks of petit mal her condition somewhat resembled that after a right-sided grand mal, the only difference being that she was not left-handed. The expression of her face was changed, she was irritable, did not apparently recognise her surroundings or those about her, her speech was reflex—*i.e.*, consisted of oaths, and ejaculations, and if touched or held she resisted or struck out.

After studying her various states the following conclusions suggest themselves. That in her normal state the left cerebral hemisphere controlled the functions of the right, and was also in a higher state of education than the right, the mental development of which must have been peculiarly low, either due to atavism—throwing back to some remote and degraded ancestor—or through congenital deficiency, not having the capability to develop. After a right-sided grand mal attack the left cerebral hemisphere was temporarily disorganised by the violence of the brain storm, thus leaving the uneducated right hemisphere alone capable of receiving and assorting external stimuli. Her mental state, never very high, was then practically that of an uneducated savage, suddenly brought face to face with strange surroundings, with only hereditary or animal instincts to guide her. Hence her purposeless resistance when held or touched, an undefined sense of weakness probably prompting the sudden acts of violence when anyone made movements near her, the purpose for which she did not understand.

After attacks of petit mal her mental condition was similar to that occurring after right-sided grand mal attacks. The only difference was that she was not left-handed. Here probably the brain storm affected the higher mental centres of the left hemisphere, while the motor centres were unaffected. After generalised grand mal attacks, the left hemisphere, recovering along with the right, retained *pari passu* its controlling influence.

G. C., a male patient in the Royal Edinburgh Asylum, suffers

from right-sided grand mal epilepsy, which is a sequela to a left-sided cranial injury. In his normal condition he is a quiet, well-behaved man, stupid and inclined to be somewhat irritable. He is normally right-handed. The seizures always start on the right side, and are sometimes unilateral, but at other times the left side is also implicated secondarily. When recovering from a right-sided seizure he is paralysed in the right arm and leg. His expression is one of wonder and confusion. He does not recognise the attendants who are usually about him, and when spoken to he makes peculiar noises but cannot speak. He is extremely stubborn, resists if held, and all his actions show that although conscious he is not cognisant of his surroundings. As soon as the motor power of the right side returns he gradually recognises faces, smiles when spoken to, and is more biddable. Inco-ordinations of speech and mild aphasia are the last symptoms of the attack to disappear. It is instructive in this case to notice that normal mentalisation does not occur until returning motor activity of the right side indicates that the left hemisphere is recovering from the effects of the epileptic disturbance.

Many cases of epileptic automatism resemble closely the symptoms noted in these cases; but as the automatic states generally follow attacks of petit mal, there is no motor indication to prove that one or other cerebral hemisphere is acting independently of its fellow. The sudden mental obliteration occurring in such patients after an attack without loss of consciousness, with evidently a sense of sudden transformation to new and unknown surroundings, appears to point to a portion of the mental cortex being thrown out of work, and also to a certain tract of cortex being still active. So closely associated are the cells and fibres of each individual hemisphere, that it is hardly to be supposed that one portion can be disorganised without the whole being affected, so we must conclude that one hemisphere is temporarily disabled, leaving its fellow to carry on such mentalisation as it is capable of. In the brains of those who, through heredity, are predisposed to epilepsy and the allied neuroses, there is possibly a considerable difference between the two hemispheres in mental development and education. A man doing mental work with one hemisphere would be much more liable to brain fatigue than the man who had both hemispheres educated. Brain cells discharge their energy with greater

ease the lower the inhibitory power falls, and every one will admit that an exhausted man, with consequently lowered inhibition, is liable to outbursts of irritability and unsound actions. The whole character of the incipient epileptic is that of a man with a brain easily exhausted. His irritable and impulsive temperament all point in this direction. And given an heredity to the neuroses, there is no great step to that sudden discharge of energy which we name epilepsy.

Viewed in this light, I suggest that, in some cases of epilepsy at least, the disease is due to a want of equal education or development in the two cerebral hemispheres, thus rendering the patient liable to unusual brain exhaustion when active mental work is undertaken, or at the developmental periods of life when new cortical areas are suddenly called into action.

### 3. NOTES ON CASES OF GALL-STONE

By RUTHERFORD MORISON, F.R.C.S., Senior Assistant Surgeon,  
Newcastle-on-Tyne Infirmary

IN the Johns Hopkin's Hospital Reports for 1890, a paper by Dr Osler appeared "On Fever of Hepatic Origin, particularly the Intermittent Pyrexia associated with Gall-stones," and in this paper Dr Osler states that in the class of case he is describing the characteristic pain of gall-stones may be absent.

In the *Annals of Surgery* for August 1895, I drew attention to the fact that absence of pain occurred in another class of gall-stone case than that described by Osler, and recorded examples. Previous to this I had introduced the subject to the notice of the Northumberland and Durham Medical Society on more than one occasion by the relation of illustrative cases.

Case I. and Case II. are typical examples of the two forms, alluded to as described by Osler and myself. The only points common to them are the presence of gall-stones causing serious illness and the absence of pain. The mental association between gall-stones and pain has naturally become so close that when this characteristic feature is missing, diagnostic errors are not infrequent; and as no gall-stone cases more urgently require surgical relief than these, I thought some consideration of them worthy of your attention.

CASE I.—E. F., aged fifty-four, was admitted to the Royal

Infirmery, Newcastle-on-Tyne, under Dr Murray's care, and was transferred to me for operation in August 1896.

She complained of jaundice. Her present illness started, nine weeks before admission, with a severe attack of pain in the region of the stomach. The pain commenced on a Monday, and lasted without cessation till the following Saturday. It was accompanied by obstinate constipation, and on Saturday by vomiting and shivering. A week after the attack, an enema was administered, and after a free evacuation from the bowels, all pain disappeared, and she became jaundiced. For the first three or four days after the jaundice was noticed she vomited everything she took, but since then has not been troubled by anything except when she got out of bed. Each time she ventured out of bed she has had a shivering fit, unaccompanied by pain, sickness, or other symptom that she is aware of, but followed by increased jaundice. (Whilst under Dr Murray's care she was allowed to get up occasionally, and each time had shivering, rise of temperature, and increased jaundice.) She has lost much flesh since her illness commenced. When eighteen or nineteen she had her first attack of "spasms." The pain was very severe, and was accompanied by shivering and vomiting. She had no return for more than twenty years, when at the age of forty (fourteen years ago) she had another attack. From this time she had "spasms" every week at least, and had to be very careful in her diet, as any error in this respect brought on the pain. Flesh meat of any sort was sure to do so. The pain commenced in the stomach, and was so severe that she was obliged to go to bed and lie curled up. She generally shivered with it, but had never been jaundiced till the present illness commenced. At twenty-five years of age she had rheumatic fever, otherwise there was nothing noteworthy in her previous health.

Her family history was unimportant in connection with the present illness. When I saw her the patient was deeply jaundiced, and looked as if she had lost a good deal of flesh. There was no sign of disease, save in her abdomen. The history of pain had to be elicited by cross-examination. The liver was considerably enlarged, smooth on the surface, and tender. Nothing else could be discovered.

Operation on August 12th, 1894, showed a much dilated common duct, from which two stones the size of ordinary

marbles were removed by incision. The gall bladder was remarkably small and hard,—so hard that without opening it no certainty could be felt as to the presence or absence of a small stone in it. The gall bladder was accordingly opened. It was quite empty, very thick walled, and had practically no cavity.

CASE II.—A. B., aged forty-nine, a patient of Dr Wilson, Amble, was admitted to the Royal Infirmary, Newcastle, complaining of an abdominal tumour, in August 1896. Her present illness commenced six years ago with “spasms.” Two or three times a week she was suddenly attacked with severe pain in the right side near the stomach. She generally vomited and sweated and occasionally shivered during the attacks of pain, which gradually grew more severe. Thirteen months ago, after a more than usually prolonged and severe seizure, the “spasms” ceased and shortly afterwards she discovered the “tumour” complained of. She has never had any of the old attacks since, but has lost flesh and the “tumour” aches and troubles her when she is stooping or going about her work. She has never been jaundiced. Her previous health had been good and there was nothing worthy of note in her family history.

On examination all her organs were found to be sound with the exception to be noted. She was flabby but in fair condition. In the right hypochondriac region a rounded swelling could be seen pushing forward the abdominal wall and descending freely on forced inspiration. The swelling appeared on palpation to be about the size of a cocoanut, and at its lower extremity of much the same shape. Its surface was rounded and smooth; it was freely movable from side to side and could be manipulated almost wholly beyond the middle line to the left side and pushed back and up into the renal region on the right. A hand on the right of the abdomen in front and another behind in the loin could plainly map out the swelling caught between them, but the hands could not be met above the tumour when it was jerked downwards by forcible inspiration nor did it disappear so completely into the upper right abdomen as a kidney of its size and mobility should have done. In addition to this it did not slip back into the kidney region as a movable kidney does, but required a little coaxing to go into the loin, and it descended aggressively against the fingers when forced down by a deep inspira-

tion. The kidney could not be felt behind it. The tumour was moored at its upper part and was dull on percussion over the front, the dulness being continuous with that of the liver.

Operation was performed on August 27th, 1896. The distended gall bladder contained  $1\frac{1}{2}$  pints of clear fluid and a single stone the size of a filbert completely blocked the commencement of the cystic duct.

In the first case the gall bladder had completely emptied itself and was contracted and thick walled; its cavity was obliterated to such an extent as to render it functionless, and the common duct was so much dilated as to make the relatively small stone contained in it incapable of blocking it except temporarily by falling into or over its duodenal outlet.

In the second case a large stone completely and permanently blocked the cystic duct, and the gall bladder steadily dilated under the pressure of its own secretion.

To quote from my article in the *Annals of Surgery* for 1895, page 199. "In looking for an explanation of these phenomena, familiar and easily observed occurrences in the urinary bladder serve a useful purpose. *Like the urinary bladder, the gall bladder will become contracted and hypertrophied when dealing with a partial obstruction, and like it will dilate painlessly when all its efforts to overcome the obstruction are futile.*"

CASE III.—M. R., aged fifty-five, a patient of Dr Hindhaugh, Newcastle, was sent to me on Nov. 24, 1896.

She complained of pain in the stomach and sickness. The pain was first felt two years ago, and commenced after eating a hearty dinner whilst she was from home holiday-making. It was very severe, attended by vomiting, and lasted for three days. At intervals since she has had similar attacks, some more, others less severe, but most of them necessitating the use of morphia. She has steadily lost flesh, but always quickly regained strength after the attacks till five weeks ago. At this time (Oct. 1, '96) she had a bad attack, and was just getting over it when she had a series of weekly seizures, each one more severe than the last, consequently she had felt very weak and ill. During the last five weeks she has been jaundiced, but never before.

Nothing noteworthy in her previous health or family history.



The patient was a thin, feeble, suffering-looking woman, distinctly jaundiced.

All her organs appeared to be sound with the exception noted. An elongated rounded elastic tumour, the size and shape of my thumb, was felt in the right hypochondrium in the position of the gall bladder and connected with the liver.

At the operation the finger-like process felt before operation was found to be a thin walled sac continuous with the fundus of the gall bladder. The gall bladder itself was thick walled and much contracted and lay hidden under the liver. Between the gall bladder and the sac there was an hour-glass constriction seen externally, and on opening the sac it was found to communicate with the gall bladder by an aperture only large enough to admit a director. Several small stones were removed from the sacculus and two from the dilated common duct. There were none in the true gall bladder.

Case III. is another example of the use to which the comparison between the urinary and the gall bladder can be put. The sacculus in the one seems to be comparable with that in the other.

It also illustrates one method in which rupture of the gall bladder could readily occur. If the case had been left unoperated upon, rupture of the sac at no distant date seemed certain; then the contracted bladder would have been found buried in dense adhesions if the patient had survived the peritonitis set up. In five cases operated upon I have found gall-stones in the midst of dense adhesions which had escaped from the gall bladder; in two other cases I have found the gall bladder forming part of the wall of an abscess full of gall-stones. This and the knowledge that such dense peritoneal adhesions are only likely to follow the rupture of some viscus lead me to believe that rupture of the gall bladder is a not uncommon event in gall-stone cases.

So far as I know, a thick-walled contracted gall bladder with dense adhesions in its neighbourhood is pathognomonic of gall-stones, and a remembrance of this fact may serve as a useful stimulus to the operator during an often apparently hopeless search for stones.

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## Meeting VI.—February 17, 1897

DR ARGYLL ROBERTSON, *President, in the Chair*

## I. EXHIBITION OF PATIENTS

1. *Dr Joseph Bell* and *Dr John Wyllie* exhibited a case of TEMPORO SPHENOIDAL ABSCESS in a convalescent from scarlet fever—treated by trephining.

M. N., aged 23, convalescing from scarlet fever, got a chill about October 17th, followed by headache and great pain in both ears, both of which discharged pus in a week after the chill.

With the exception of a few hours on three successive days, pain was constant. For three weeks patient was dull and anæmic looking, with occasional attacks of irritability and silliness. On November 15th she vomited, and pulse 'has been gradually slowing, even as low as 46'. Pain and tenderness on right side of head and in front of right ear, which is still discharging. Twitching of muscles on right side of face—paralysis of facial and ptosis of right eyelid—deafness and great depression of spirits. Pulse 60. No optic neuritis.

November 20.—Mr Bell, at Dr Wyllie's request, trephined one inch in front and one inch above the external auditory meatus. No pus below dura, which bulged. Brain was cautiously explored by sinus forceps, and an abscess was found at depths of about an inch containing at least  $\frac{1}{2}$  ounce of pus.

Before operation right pupil was widely dilated and left moderately contracted. Pulse was 50. In ten days the pupils were equal and pulse was 100.

The strictest aseptic precautions were used. The abscess was washed out with boracic lotion and drained for two days. The after progress was absolutely uneventful. T. remained normal. No suppuration of wound. Only a serous oozing from the abscess, which ceased after three days. An occasional purgative was required, and she is now quite well.

2. *Mr A. G. Miller* exhibited a case of SPINA-BIFIDA OCCULTA.

Patient had influenza two and a half years ago, followed by pains shooting down legs—weakness in legs. Swelling in lumbar region one year ago.

Tumour fatty, possibly s. b. o.

Operation on January 14th, 1897.

On raising tumour, deficiency in sacral region observed.

Drain of cerebro-spinal fluid for a fortnight.

Complete removal—no return of pain—stronger. Patient expresses himself as feeling perfectly well, only a little weak in back.

Chronic spinal affection perhaps meningeal, resulting from influenza, acting on a congenitally weak cord (evidenced by the s. b. o.). Relieved by lumbar puncture and drain of cerebro-spinal fluid. Time will tell.

### 3. *Mr F. M. Caird* exhibited—

(a) A patient, aged 18, suffering from IMPERMEABLE CICATRICAL STRICTURE OF THE ŒSOPHAGUS, on whom he had performed gastrostomy after the method of Witzel, on August 18th, 1893 (see *Trans. Medico-Chir. Soc., Edin.*, Vol. xiii., p. 26). She is in perfect health, and all her alimentation is carried on by the artificial opening.

(b) A case in which excessive EXOPHTHALMOS had greatly diminished after removal of one half of the thyroid gland. Prior to the operation, several attempts had been made to mitigate the condition and save the eyes by rawing and suturing the edges of the lids, since ulceration of the corneæ had taken place.

(c) A patient who had two years ago EPITHELIOMA of the penis and of the lymphatic glands in each groin. The greater part of the penis had been removed, and the connective tissue and glands in the groin cleared away. There had been a slight recurrence about a year after in the groin, which required a small operation for its removal, but the patient was now in sound health.

4. *Dr John Thomson* exhibited a boy, aged 15 years, with CHRONIC ENLARGEMENT OF BOTH PAROTIDS. Seven years before, he had had an ordinary attack of mumps, and the present condition had lasted ever since. It caused no inconvenience.

5. *Dr Allan Jamieson* exhibited a female patient with TERTIARY SYPHILIS, presenting symmetrical seborrhœic complications. She was a married woman, æt. 41, who came to the Royal Infirmary in the early part of January 1897. There was a history of syphilis dating five or six years back. The eruption on the face commenced two years ago, as a sort of "eczema," which was treated with starch poultices. When first seen the whole of the nose and the malar portion of both cheeks were thickly covered with pale yellow, scaly, sebaceous crusts, but in parts, especially the left ala of the nose, there was ulceration and exuberant vegetating growths, so that the appearance somewhat resembled the sebaceous form of epithelioma. After the surface had been cleansed by boric starch poultices, the appearances were thus described by Dr Cameron, my non-resident clinical clerk. "The whole of the nose and adjacent parts of the cheek are covered with a bat's wing-like eruption. On the right ala this is dry, erythematous, and tends to scale, while it is lumpy from small tubercle-like masses. The left ala also shows scaling, the epidermis being elevated into blebs, from which a serous discharge escapes. The tip of the nose, and particularly the left lower ala, is ulcerated and thickened, the ulceration extending inside the nostril. From these parts a semi-purulent discharge is secreted. On the malar portion of both cheeks, the skin is reddened, scaly, and tending to crust, especially at the margins of the affected parts. There were numerous white thin soft scars on various parts of the face and body, left by former ulcerative processes. On the left leg there were some ulcers of serpiginous type, with intervening erythema, and scarring." The treatment consisted of the administration of potassium iodide in ten grain doses thrice a day, combined with rather more than a grain of carbonate of ammonia. Locally, the ulcers and eruption generally were dressed with Unna's zinc ichthyol salve muslin till the 24th January, when all the ulcers had healed; on that date a resorcin, salicylic, and ichthyol, vaseline starch paste was substituted. The case shows a combination of tertiary lesions with seborrhœic eczema. This is common in the secondary stage, but much less frequent, at least to such a pronounced extent, in the tertiary period. The case also when first seen, exemplified the mode in which syphilis imitates disseminated epithelioma of the face, "sebaceous" in type at

the outset, so admirably described and illustrated by Ernest Besnier in Part III. of "The Saint Louis Atlas of Skin Diseases and Syphilitic Affections."

6. *Dr C. W. MacGillivray* exhibited a case of EXCISION OF CONDYLES OF THE HUMERUS, for unreduced dislocation of elbow with fracture of condyles.

The patient, a lad aged 20, was sent from Orkney to the Royal Infirmary on account of an injury to the right arm, which he had sustained three months previously. His history was that he had fallen out of a post-gig, alighting on his right arm, which was twisted under him. When seen by the doctor two hours later, the swelling was said to be too great to allow of a diagnosis being made, and the arm was laid on a pillow with fomentations for a week, at the end of which time it was put up for more than a month on a straight anterior splint. Since then it has remained in a straight position, the patient being unable to bend it, and the arm has consequently been very useless.

On examination, it was found that the patient has sustained a dislocation of the bones of the forearm backwards and outwards with angulation, the condyles being much thickened, indicating probable fracture of internal condyle into joint. As reduction was impossible an operation for the removal of the condyles was recommended. This operation was first recommended and practised by Dr Heron Watson five-and-twenty years ago, for ankylosis of the elbow joint after fracture, as so often happens in children. This is the third case Dr MacGillivray has operated on, for unreduced dislocation with fracture. The two former were in children, and the results which he showed to the Society were eminently satisfactory, the operation being performed subperiosteally, and perfect movement with reproduction of the condyles resulting in a few weeks.

In this case the operation was much more difficult on account of the hardness of the bone and the amount of displacement, but he was able to carry it out by means of the usual linear incision to the inner side of the olecranon, no muscles being divided. The arm was put up in the straight position with extension for a week, until the wound had healed, and now, after three weeks, perfect passive movement is the

result, though the age of the patient has prevented reproduction of the condyles as in the previous cases, and active movement is as yet far from complete, the time being as yet too short to expect such a result.

7. *Mr David Wallace* exhibited a patient after operation for "BILOCULAR HYDROCELE."

H. D., æt. 6 years, had a swelling in relation to right testicle with the characters of hydrocele. It had been tapped thrice, but refilled in a few hours after tapping. It diminished in size gradually when he was kept in the recumbent position. Another swelling, situated at the right internal abdominal ring, came into view when he coughed. The diagnosis was congenital hydrocele with incipient inguinal hernia on the same side, and the radical cure of both was advised.

Operation on 6th September, 1896, showed that the lower swelling was a hydrocele, but no communication with the general peritoneal cavity could be found—a flattened fibrous cord passed up to the internal abdominal ring. The patient, while the opening was being looked for, came out of anæsthesia and coughed, when the upper swelling was protruded to an extent of three inches—a cylindrical thin walled swelling with clear fluid.

The anterior abdominal wall was opened up a little higher than before to discover the attachments of the second sac—when it was found that it also was a closed sac tensely filled with fluid. It ended at the superior part as a fibrous cord which passed down towards the pelvis. The sac, which was smaller than the scrotal one, lay in the extra-peritoneal fat, proving the hydrocele to be the "properitoneal" variety of the bilocular. This sac was completely excised. The margins of the inguinal canal were approximated, as in radical cure of hernia. The patient made an uneventful recovery, and has now no hydrocele or tendency to hernia. The case differed from the usual condition found in the bilocular hydrocele in two particulars—1st, The absence (?) of communication between the two sacs, and 2nd, In the upper sac being smaller than the lower.

8. *Mr C. W. Cathcart* exhibited a man, æt. 45, with a RODENT ULCER OF THE GROIN.

The case had been sent to the male lock ward as one of venereal disease. The history he gave was that about three months previous to seeking hospital advice, he had suffered from considerable urethral discharge following a month after connection. He had been drinking heavily about that time. While the gonorrhœa was in progress, he noticed for the first time a lump in his left groin, the size of a hazel nut. He then consulted a doctor, who kept him in bed for a fortnight, after which the gonorrhœa was cured. The lump, however, continued, and, after giving him much inconvenience, was lanced. This gave him considerable relief, but the opening left after the lancing has gradually enlarged, sometimes seeming to heal and then breaking down again.

The condition had not materially altered during his stay for a week or two in the lock wards, where the ulcer had been carefully dressed, but while under observation some parts had healed, broken down, and began to heal again. The ulcer extends from the inner third of Poupart's ligament inwards over the pubes to the root of the penis, and has destroyed a strip of skin about three-quarters of an inch in breadth, on the left side and under surface of the organ, tailing off gradually on the right side.

The edges of the ulcer are abruptly raised and rounded, and at places everted. The outline of the sore is serpiginous. The floor is excavated; its surface is smooth, and of a bright red colour, but without any granulations.

The inguinal glands on both sides are enlarged and matted together.

A small piece of the edge of the ulcer was snipped out, and cut with an ether-freezing microtome. It showed numerous groups of small epithelial cells in alveoli. As the naked eye and microscopic characters corresponded with rodent ulcer, the case was to be sent to one of the general surgical wards for operation.

9. *Mr Alexander Miles* exhibited—

(a) CASE OF DOUBLE AMPUTATION ABOVE THE KNEE FOR SPREADING GANGRENE. The patient, a man aged 56, was found lying out on Leith Links, on November 17th, 1896, and was removed to the hospital. On admission, he was in a very

weak state from exposure and starvation. Both feet were in a condition of moist gangrene—on the right side the process having spread as far as the lower third of the leg; on the left side to the level of the tarso-metatarsal joints. On both sides an area of œdema and hyperæmia extended well beyond the limit of the gangrene. No popliteal pulsation could be made out on either side.

Immediate operation being contra-indicated by the low condition of the patient, the parts were simply treated by local antiseptics, and the general state attended to.

For twelve days after admission the gangrene very slowly spread, reaching about half-way up the limb, and the patient suffered from septic poisoning in a marked degree, the temperature ranging from 100° F. to 104° F., and the pulse from 96 to 136. During this time he was semi-comatose, and the propriety of operating, though frequently discussed, was doubted.

A line of demarkation ultimately formed, and the patient so far improved as to justify one in recommending operation, which was agreed to.

Both limbs were amputated through the condyles of the femur—the right by lateral, and the left by antero-posterior flaps. On each side an area about the size of a florin sloughed from pressure against the edge of the sawn bone, and these areas have healed exceedingly slowly. Considerable general improvement followed the operation, and the patient has now quite recovered, but for the small superficial ulcers on the stump, which have all but healed.

(*b*) A PATIENT AFTER OPERATION FOR GALL-STONES. Mrs R., aged 48, had suffered for some months from symptoms of dyspepsia, associated with severe abdominal pain and sickness. These attacks gradually became worse, and eventually she was admitted to Leith Hospital under the care of Dr Elder. She had three severe attacks of biliary colic between August and December 1896. In all of them there was great pain, evidently associated with a localised peritonitis in the region of the gall-bladder, in addition to the characteristic pain of gall-stones. In each attack a distinct swelling was palpable, in the first undoubtedly cystic, in the other two less certainly so. Marked jaundice was present in the first attack, but was absent in the others. The diagnosis was impacted gall-stone



in the cystic duct. An operation was performed, and on opening the peritoneum a mass, about the size of the palm of the hand, and of the shape, thickness, and consistence of a placenta was found in the omentum. Some recent lymph lay on its surface. The appearance suggested a malignant tumour of the omentum, but further exploration showed it to be an inflammatory mass, overlying a distended gall-bladder. From the bladder and cystic duct 16 gall-stones weighing 138 grains were removed; two of these were much larger than the others, weighing 50 grains each, and one of these was impacted in the cystic duct. The patient made an uneventful recovery.

(c) A SERIES OF CASES OF BURN TREATED BY PICRIC ACID. Cases illustrative of the advantages of the picric acid treatment of burns were shown.

The method consists in removing all gross dirt and debris with a mild antiseptic lotion, and then applying strips of lint wrung out of a saturated solution of picric acid, made up as follows:—

℞ Acid. Picric.,	gr. 45
Alcohol Æthylici,	℥jss
Aquam ad,	℥xxx

Antiseptic wool and a bandage complete the dressing. Unless specially indicated the dressing need not be changed for three or four days or even longer.

10. *Dr William Russell* exhibited—

(a) A WOMAN WITH FLOATING KIDNEY. The right kidney was the one most frequently affected, and this case followed the common rule. The organ was freely movable, falling downwards towards the brim of the pelvis when the patient stood erect, and being readily pushed back into its normal place in the loin. It was associated with great dilatation and dislocation of the stomach, the lower curvature of which reached almost to the pubes. This was an association which had attracted considerable attention, as in some cases they seemed to be related as cause and effect. Were it not for the unsatisfactory state of this patient's lungs he would have recommended operation, as she suffered considerably; and both the kidney and the gastric condition were amenable to surgical treatment.

(b) A woman with a swelling in the right hypochondrium

between the margin of the ribs on that side and the umbilicus. The swelling was not very marked, but some weeks before it was distinct and painful, and the patient had a rigour. He at that time believed it to be A DISPLACED KIDNEY WHICH HAD BECOME HYDRONEPHROTIC, an occurrence he had frequently seen in such cases. The swelling had gone down coincidentally with the free movement of the bowels by enemata, and there was thus a legitimate doubt as to whether or no the tumour was kidney. He was still inclined to think it was, and that the acute attack had been determined by the distended colon affecting the position of the kidney or interfering with the ureter.

11. *Dr Stewart Stirling* exhibited—

A case of PERFORATING ULCER OF THE FOOT. C. G., cellarman, æt. 44, states that this disease commenced about a year ago as a blackish spot resembling bruised blood on the ball of the second right toe. When he came under his observation in July last year, he found the toe enormously hypertrophied by hardened epidermis which implicated the entire nail. After softening and removing the epidermic mass, a sinus (with ingrowing of the dermis) was found leading down to the bone, from which a scanty serous-looking discharge oozed away. The affected parts were quite painless, the free paring of the edges of the sinus and the application of caustics to the cavity producing no painful sensations. A special feature in connection with this case was, that about six weeks ago another trophic affection appeared on the ball of the great toe of the opposite foot. It commenced as a gangrenous patch which separated after a few days, leaving a clean sore. Since then this ulcer has markedly improved under a lotion of perchloride of mercury. The patient takes nux vomica internally, and the original ulcer has been treated by free incisions of its edges, the application of acid nitrate of mercury solution, and a paste of salicylic acid and carbolic acid. A considerable improvement has now taken place. The exciting cause appears to be due to pressure probably of the boot, acting on the peripheral terminations of the nerve.

12. *Dr Alexander James* exhibited—

(a) A case of IDIOPATHIC MUSCULAR ATROPHY, in which the

disease had commenced in the left thigh and leg. The patient was a man, aged 25, a gardener by occupation, and he stated that he had been ill for five years. The disease had begun by a feeling of soreness in the left thigh and leg, coming on specially after he had been working for some time. The condition had gradually got worse, and now, although the soreness was gone, the weakness was such that he was markedly lame on walking. On examination there was found considerable wasting of the muscles of the left hip and thigh, and also of the tibialis anticus of the leg, with slight wasting of the other leg muscles, and of the muscles of the right thigh and leg. The reflexes were diminished, and the response to electric stimulation, both faradic and galvanic, was less than normal. There were no fibrillary twitchings, nor was there any family history of nerve or muscle disease.

(b) A case of OLD EMPYEMA. The patient was a man, aged 46, who had had typhoid fever followed by empyema twenty-five years ago, and had been treated in the old Royal Infirmary. The empyema, which was of the right side, had been opened between the fifth and sixth ribs, and drained, but the drainage had evidently not been satisfactory. He had been ill for ten months, during which time, on two occasions, collections of pus, apparently loculated, had found their way outwards through the chest wall. He had yet recovered wonderfully well, but his chest showed markedly the results of indrawing of its walls. The right side was much the smaller of the two, the right shoulder was lowered, and the spine was curved. The liver was drawn upwards, but the case exemplified a noteworthy point, and this was that the heart was not displaced. The reason of this was that the drawing up of the liver mechanically prevented the heart being drawn over to the right.

Dr James pointed out that marked displacement of the heart to the right was due to mischief in the upper lobe rather than the result of delayed pleuritic absorption.

13. *Dr Norman Walker* exhibited—

(a) Two sisters, one of whom had had RINGWORM OF THE SCALP for eight months, the other ALOPECIA AREATA for four weeks. Although he was not prepared to go the length which Mr Hutchinson did, he thought there was some obscure connection between the two diseases.

(*b*) A case which was possibly a very well-marked case of *TINEA CIRCINATA*, although he had not been able to assure himself of the presence of the fungus. The man had been in the army, and had had bubo, but, he said, no syphilis.

## II. EXHIBITION OF SPECIMENS.

1. *Dr Norman Walker* exhibited a specimen under the microscope from a case of *RODENT ULCER*, where in advance of the ulcerated portion was a distinct part, in section of which the development of the ulcer from the rest was evident.

2. *Mr A. G. Miller* exhibited a *TEMPERATURE CHART* (from a case of *ACUTE TUBERCULOSIS*) of the excision of wrist joint.

Patient had cough, bronchial breathing, but no moist râles.

Operation on January 15, 1897. Rise of temperature two days after. Tubercular curve, *i.e.* irregular, with highest point in afternoon, night temperature sometimes lowest. Breathlessness, sweating, etc. No sepsis, wound aseptic. Condition similar to effects of tuberculine from absorption of tubercle products from operation wound. Bacilli in sputum not numerous.

3. *Sir Henry D. Littlejohn* exhibited—

(*a*) A *SUICIDAL WOUND OF THE NECK*, involving the sterno-mastoid muscle and the superior thyroid artery. It was limited in extent and ran parallel to the median line. It measured  $1\frac{1}{2}$  inches long,  $\frac{1}{2}$  inch broad, and  $\frac{1}{2}$  inch deep. The instrument was an ordinary double-bladed pen-knife. The cause of death was hæmorrhage. The contents of the cervical sheath escaped injury.

(*b*) A *PISTOL WOUND OF THE SKULL*. It was the aperture of exit in the right occipital fossa. Deceased was found lying dead. He was ambi-dexter, and had discharged the weapon through the left eye, which was totally disorganised. The bullet fractured the sella turcica, ploughed the under surface of the cerebrum and passed through the cerebellar lobe. The bullet, together with five fragments of bone, was lying immediately under scalp, which was not penetrated.

4. *Dr C. W. MacGillivray* exhibited—

(a) The CONDYLES OF THE HUMERUS excised for unreduced dislocation of the elbow with fracture of condyles, from the patient already exhibited to the Society.

(b) A specimen of RUPTURE OF THE BLADDER. The case was an exceedingly interesting one. The patient, a miner, when drunk on a Thursday evening, met with an accident, the nature of which is not known, but as the result he had much abdominal pain, and was unable to pass water. He was seen by a doctor in the country, who drew off some ounces of bloody urine. The urine, small in quantity, continued to be drawn off at intervals until Saturday, when symptoms of peritonitis having manifested themselves, he was sent in to the Infirmary. On admission at 8 P.M. he was quite sensible. Pulse and temperature 100. Not much pain when left alone, but he lay with his legs drawn up, and the abdomen, over the lower half, hard and board-like, and painful on pressure. His urine, which had not been drawn off since the morning, amounted to 11 ounces, and was clear but high coloured, and contained only a trace of blood. The diagnosis was:—Rupture of the bladder, but whether extra or intra-peritoneal it was impossible to say. An incision was made over the pubes, and the anterior wall of the bladder exposed. As nothing abnormal was found the peritoneum was opened, and the finger at once passed into the bladder through an irregular tear  $2\frac{1}{2}$  inches long, passing from before backwards and joined by a transverse tear 2 inches in length. Beyond a small quantity of bloody fluid in Douglas' pouch, the peritoneal cavity was dry and only exhibited slight traces of peritonitis. The wound was with some difficulty sewn up with fine silk, and the abdominal wound closed except for a glass tube introduced into Douglas' pouch. The next day the patient was feeling very well, temperature normal, pulse about 100, but there was a constant tendency to vomit small quantities of brownish material. Towards night the pulse became more rapid and the patient weaker, and the next day at twelve noon he collapsed and died, probably from poisoning from toxins. On post-mortem, the sutured bladder was found to be water tight, and very little peritonitis present: a curious fact considering that the contents of a full bladder must have been extravagated into it.

(c) THREE CALCULI removed from the pelvis of the kidney of a young man, aged 25, who since eight years of age has suffered from paroxysmal attacks of pain in the left iliac region and liver, extending down the thigh but without urinary irritation. These attacks disappeared at times for two years, at other times recurred every month. A year ago, he was under Dr MacGillivray's care, and rest, milk diet, and Centrexville water completely cured him for the time being, and during the past year he has only had very occasional attacks. A month before the operation a severe attack took place with marked hæmaturia, which continued with recurring pain until the operation. The operation was the usual one by means of an oblique lumbar incision. The kidney was exposed and drawn out, the stones felt in the pelvis, the kidney punctured in its convexity with sinus forceps, the finger introduced into the pelvis through the kidney substance and the stones withdrawn: a drainage tube being introduced down to but not into the kidney. The patient made an uninterrupted recovery. The tube was withdrawn on the third day. No urine ever escaped from the loin. Dr MacGillivray's only reason for not showing the patient, was that the members of the Society would only see a remarkably healthy-looking young man with a cicatrix on the back, who, since the operation, has had no hæmaturia, pain, or urinary trouble of any kind.

5. *Dr Joseph Bell and Dr Alexander Bruce* exhibited—

(a) A PERFORATED APPENDIX from a case with marked symptoms. B. C., æt. 8½, previously healthy, was admitted at 5 P.M. on February 7th, and died at 2 A.M. next day, with following history. Chill a week ago, vomiting with pain in abdomen, chiefly in left iliac fossa. No medical advice, but seen by Dr Cumming, Gilmore Place, on 5th. Bowels were freely moved by injection, flatus passed; abdomen tender and tympanic on admission, vomited at 8 P.M., after which at 10 T. rose suddenly to 104, with delirium, severe pain and urgent vomiting, which became fæcal. In my absence she was seen by Mr Stiles, who saw no chance of operative interference. She died at 2.15. T. rose after death to 107.6.

*Diagnosis.*—Perforation of intestines.

*Post-mortem.*—On opening abdomen an acute purulent peritonitis was found. Pus being contained in pocket between intestines, spreading in both iliac regions; appendix lay behind cæcum, and was matted into fibrinous lymph; a minute oval perforation was found within  $\frac{1}{2}$  inch of its apex.

(b) Two cases of INTUSSUSCEPTION in children aged five months, admitted within a fortnight of each other. In both, the symptoms were marked and acute; in both, enemata and inversion caused disappearance of the tumour and marked relief to the symptoms; in one, with three different well formed motions. In both, the symptoms returned shortly before death, and in neither, had operation been attempted, could there have been any real hope of a satisfactory result.

Both specimens illustrated the manner in which the tumour disappears into descending colon concealed by the liver.

In each case the *complaint* was vomiting and passage of blood per rectum *during a period of* from eighteen to twenty-two hours before admission.

CASE I.—Child much collapsed *on admission*. An elongated tumour could be easily palpated stretching across abdomen, about one inch above level of umbilicus—stretching from left lumbar region to liver line. This tumour was painless and movable. There was a want of resistance in right iliac fossa.

*Treatment.*—With large enemata and successive manipulations the tumour gradually entirely disappeared and symptoms were relieved.

*Progress.*—On the second day after admission temperature rose, there was a return of symptoms, and child died.

*Post-mortem.*—An intussusception was found placed deeply behind costal margin on left side—intussusception could not be reduced. Some small intestine, ileo-cæcal valve, cæcum, and greater part of ascending colon had become invaginated into the transverse and upper part of descending colon.

CASE II.—Tumour felt *on admission* on right side about level of umbilicus. The same *treatment* was carried out with the same *result*—viz., relief of all symptoms and disappearance of tumour—child had thus formed motions. On the second day after admission, symptoms returned, tumour became evident, temperature rose and the child died.

*Post-mortem.*—Deeply placed to right of last dorsal vertebra an intussusception 3 inches long, comprising all remainder of large and part of small was found. Entering bowel could not be pulled out with moderate tension.

6. *Dr Logan Turner* explained and exhibited specimens illustrating the METHOD OF EXHIBITING MUSEUM SPECIMENS suggested by Mr James Simpson, Assistant Curator, Anatomical Museum, University of Edinburgh.

1st. The labels are inside the jars attached to the glass ; this (*a*) prevents them getting dirty and torn, (*b*) allows of the jars being dusted and washed without damaging or losing labels.

2nd. The labels may be printed or written on ordinary paper, the text remaining unaffected by the spirit. This has been tested for ten years. They are attached by a cement which protects the ink and paper from the action of the spirit.

3rd. The jar may be intersected by a sheet of coloured glass, forming a background against which the specimen is set off. The tint of this may vary, being black, dark blue, or light blue to suit the specimen.

4th. A clinical history of the case, and a drawing of the microscopic structure of a tumour, may be also fixed within the jar, and thus the whole is complete and a museum catalogue may be dispensed with. Both for the teacher and the student this would prove a most valuable method for exhibition.

7. *Mr David Wallace* showed a specimen of RECTAL CARCINOMA removed by Krashe's method of operation. The tumour was spherical, and as large as a cricket-ball. Its attachment to the anterior wall of the rectum was small, so that it seemed pedunculated. At the operation it was found that the peritoneum had been drawn into the pedicle, and was firmly attached to the tumour. The peritoneal cavity was of necessity opened into, but the patient made a good recovery.

8. *Mr J. M. Cotterill* exhibited—

(*a*) The specimen removed by ENTERECTOMY from a child of seven, who had suffered from stricture of the intestine for some six months.



The stricture was discovered just below the ileo-cæcal valve: it was fibrous in character, and evidently the result of previous tubercular ulceration in and around the gut: there was enormous hypertrophy of the small intestine above the stricture, and nature had brought about an anastomosis between two adjacent portions of gut, unfortunately, however, opening just *above* the stricture.

About 10 inches of small intestine and 3 of cæcum were removed, and an end to end anastomosis brought about by Hayes' bobbin. The patient made an uneventful recovery, and left the Infirmary cured in fourteen days.

(b) A specimen of **ULCER ON THE FOREARM** for which amputation had been performed. The ulcer, situated on the wrist, and of about 4 inches in diameter and  $1\frac{1}{2}$  inches in depth, had eaten deeply into all the soft and bony structures, and necessitated amputation. This was carried out above the elbow, as the epitrochlear gland was affected and very adherent to its surroundings.

The nature of the ulcer was uncertain; the majority of those surgeons who had seen it considering it to be rodent ulcer, in spite of the youth of the patient (19) and the position of the tumour. Others thought it might be epitheliomatous in the ordinary sense, while others again suggested syphilis. The absence of any personal or family history of specific disease, and the entire ineffectiveness of antisiphilitic treatment which had been persistently tried, seemed to negative this conception.

Numerous sections had been made of the tumour, but so far no definite opinion was forthcoming, but the case was still under observation.

(c) A **SARCOMATOUS TUMOUR**, apparently originating in the interval between the bladder and rectum, and invading the lumen of the small intestine.

The case was extremely interesting in so far as the patient, a boy of seven, had presented no symptoms whatever till five days before death, when he was suddenly seized with obstruction of the bowels: fæcal vomiting ensued in four days. The case was sent into the Infirmary as one of intussusception, which it certainly simulated very closely, but on examination per rectum, a large sarcomatous mass was felt in the position of the prostate. The small intestine was opened above the

tumour, in order to stop the faecal vomiting; the patient sank and died the following day.

The tumour was about the size of a small cocoanut, and it is astonishing that so large a tumour, invading the lumen of the bowel, should have given no earlier signs of its presence.

### Meeting VII.—March 3, 1897

DR ARGYLL ROBERTSON, *President, in the Chair*

#### I. LETTER FROM LORD LISTER

The following Letter from Lord Lister was read, thanking the Members of the Society for their congratulations on his elevation to the Peerage:—

12 PARK CRESCENT, PORTLAND PLACE,  
1st March 1897.

DEAR DR GRAHAM BROWN.—I was, I need hardly say, very much gratified by the extremely kind words of congratulation which you conveyed to me from the Medico-Chirurgical Society. I beg you to express to them my cordial thanks.

I feel that an apology is needed for so tardy an expression of my gratitude. It has been caused by an almost overwhelming pressure of correspondence.—Believe me, very sincerely yours,  
LISTER.

#### II. ELECTION OF MEMBER

John Macmillan, M.B., D.Sc., F.R.C.P. Ed., Warrender Park Road, was elected an Ordinary Member of the Society.

#### III. EXHIBITION OF SPECIMENS

1. *Dr James Cameron* exhibited—

(a) Two specimens of TYPHOID VACCINE prepared by Professors Wright and Semple of Netley.

The mode of preparation and the method of inoculation have been freely described by these gentlemen (*B. M. J.*, January

30th, 1897). He (Dr Cameron) has merely confirmed their results in his own case.

Each tube consists of a suspension of presumably-dead typhoid bacilli in a broth solution.

The quantity in each tube corresponds to what is technically called  $\frac{1}{3}$  original "tube," and corresponds to half the lethal dose for a guinea-pig of 350 gr. ( $11\frac{1}{2}$   $\bar{3}$ ) weight.

The original "tube" consists of a mass surface culture of 24 hour old bacilli on an agar surface measuring 10 c.m. long, the dimensions of the glass tube being 15 c.m.  $\times$  1.8 c.m., giving an area of about 18 sq. c.m., and is lethal for four 350-gramme guinea-pigs.

A scraping is mixed with broth, the virulence of the culture is ascertained, and thus the dosage estimated and the suspension apportioned in measured tubes with sealed capillary ends is sterilised by heating up in a water-bath to 60° C. = 140 F. The sterility is insured by trial on agar before the specimen is sent out.

The "vaccine" therefore contains bacilli and their intracellular poisons suspended in broth. It must be well shaken up before use. It readily passes through a *medium-sized* hypodermic needle.

He (Dr Cameron) made two injections on himself, the quantity in each case being the same as in the specimens handed round. With a view to preventing local œdema, and of counteracting the fluidity of the blood which bacterial poisons produce, calcium chloride (B. P.) in 15 gr. doses as advised by Professor Wright was taken thrice daily. In the first experiment double this dose was taken—a mistake.

The *symptoms* following injection into the loin with sterilised syringe and antiseptic precautions were briefly as follows:—The fact that the second injection was made too soon after the first, being responsible for the rather more aggravated symptoms than ought normally to have ensued. Bee-sting sensation followed gradually in the course of three hours by considerable local swelling and pain, reddening of the lines of lymphatics up to the axilla and down to the groin, enlargement of the axillary and inguinal glands. In the second inoculation distinct *rigor* four hours after inoculation, rather severe headache. Temperature rising to 100° F. in the first, and 101° F. in the second case; eight hours after the injection, sleeplessness,



not occur if a Pasteur pipette is used and sealed at the bottom, as the fluid from expansion of air beneath it merely rises a little.

A fallacy resulting from the drop drying and "shoaling" the bacilli round the margin in clusters must be carefully avoided by only using thoroughly well-made air and vapor-tight cells.

And then fallacy may occur in *serum* where an albuminous ppt. may occur not composed of bacilli. Here vaccine tubes have a great advantage as sedimenting tubes, for the sediment in the tube can be directly examined under a 300 power lens, and the individual bacilli at the edges of the mass identified.

Further, from the fact that the number of bacilli in a given broth culture may vary very much, we cannot expect a copious ppt. when the number of bacilli is small. The number depends on the size of loop in inoculation and bacilli multiply by a sort of combined geometrical ratio. For the microscopic method of Widal's reaction a culture inoculated with a small quantity of bacilli is best, as the individual clumps are well defined and not too large. While for the ppt. effect in tubes a very turbid thickly populated culture is the best, as it yields a bigger ppt.

The difficulty in the large dilutions is the intimate mixing of the relatively small quantity of serum, with the proportionate quantity of normal saline solution and typhoid broth. The bacilli, however, even in these dilutions, in a few hours work their way through the whole, and, as a result, are paralysed. In every case simultaneous control experiments were made with normal saline solution.

The first inoculation was made on Sunday, 6th February (left loin); the second, Thursday, 11th February (right loin). The interval was, however, much too small, and is responsible for the more severe symptoms that according to Professor Wright ordinarily follow second vaccinations.

(b) Professor Wright's serum sedimentation tubes, made by Mr Dean, 73 Hatton Garden, E.C., which are very convenient for accurate dilutions "sedimenting."

Since the method of Professors Wright and Semple entails no greater inconvenience than an ordinary well-done vaccination and if precipitating and agglomerating power is to be taken as an index of immunity, its immense benefit is obvious, and it is to be hoped that it will be tried by members of this Society. The

case of nurses in typhoid wards is particularly pertinent with respect to the acquisition by this simple method of immunity against typhoid.

In conclusion, he has to thank Professor Wright for many hints, and also Dr Brock, in whose laboratory the cultures and serum were used, and who kindly called on him during the first inoculation, and who has observed and followed the results during the experiments.

2. *Mr H. J. Stiles* exhibited the RIGHT ARM OF A CHILD, aged 4 years, in which the arteries were injected with mercury, and also skiagraphs of the same. He stated that shortly after the amputation of the arm, a small canula was tied into the brachial artery; a piece of rubber tubing about 2 feet long was attached by one end to the canula and by the other end to a glass funnel; the funnel was then elevated above the level of the limb, and mercury gradually poured into it. By elevating the mercury to a height of 2 or 3 feet, it could be made to spurt out for a considerable distance from the divided vessels at the amputation surface. At first it seemed doubtful if the injection had been successful, as only about 10 c.c. of mercury was retained in the limb. On making a small skin-deep incision into the point of the ring finger minute globules of mercury escaped, thus showing that the mercury had reached the smallest vessels. Before taking the skiagraph the limb was interposed between the X rays and the screen, with the result that deep shadows of the vessels were distinctly seen. The photograph shows that even the smallest vessels have been revealed, and that mercury gives infinitely better results than plaster of Paris. With a coil giving an 8" spark, it was found that an exposure of 90 seconds showed the vessels very distinctly, but not so the bones, which were over-exposed; in this particular specimen an exposure of 45 seconds gave the best results. To show the arteries distinctly in the adult, a longer exposure is necessary, in order to diminish the depth of the shadows cast by the bones and so as not to obscure the vessels. In this hand the radial artery does not appear to have given off, either directly or indirectly, any definite branch to complete the superficial palmar arch; indeed an arch can hardly be said to exist. The digital branches might be described as the result of three bifurcations,—first of the trunk, then of its external

division, and finally of the external division of the second bifurcation. He (Mr Stiles) cannot help thinking that the classical description of the ulnar artery in the palm applies only in the minority of cases. In those instances in which the "arch" is completed by the radial, the anastomosing branch, as a rule, is not only small, but very variable as to its mode of origin. The *superficialis volæ*, although larger than usual, has, in this instance, no connection with the ulnar, and appears to end in the muscles of the thumb. The deep branch of the ulnar arises, as is not infrequently the case, from the digital branch to the little finger. In point of size and direction, it would appear that the *arteria princeps pollicis* has more right to be regarded as the continuation of the radial than has the deep arch. The loop which the *arteria princeps pollicis* exhibits as it lies in the web of the thumb is possibly a provision for preventing undue stretching of the vessel when the thumb is fully abducted; no such loop is seen in the photograph taken with the thumb in the latter position. It must be left, however, to other specimens to show whether this looping of the vessel is a constant condition. We know that something very similar occurs at the elbow, and possibly also at the knee. The rich blood supply to the pulp of the fingers and the matrix of the nails is well seen. He would draw attention also to the two collections of mercury which are situated a little above the wrist. At first sight these might be taken for accidental extravasations, but closer inspection shows that the mercury is confined to the lower ends of the diaphyses of the bones of the fore arm. This is of interest when we remember how actively growth takes place in this situation during childhood. This high degree of vascularity, combined with the slowness of the circulation, is, as is well known, the explanation usually given for the frequent occurrence of tubercle in the extremities of the diaphyses of growing bones. The photograph certainly appears to lend support to this explanation. The vascular loops which the vessels form on the diaphysial side of the epiphysial cartilage are not only very large and reduced to a single layer of endothelium, but they are also very badly supported, so that it is quite possible that some of them may have given way. Although the skiagraph has been taken from a child's limb, it is to be hoped that equally good results may be got in adults by prolonging the exposure.

He is not without hope that the employment of the X rays to parts which have been injected with mercury, will prove of service to those engaged in the teaching of surgical anatomy and operative surgery. As regards the arteries, their general course, their branches and anastomoses, and their relations to the surface are well brought out. It is seen also that this method opens up to the anatomist a field of investigation worthy of his attention. An attempt should be made to record the position of various organs by skiagraphy, after injecting their blood vessels with mercury; such organs as the spleen, kidneys, etc., ought to lend themselves to this method of investigation; and perhaps, also, some of the hollow viscera could be dealt with in the same way. Mercurial injections of the lymphatics ought certainly to be photographed by the X rays, as it is possible that in this way more light might be thrown upon the paths of lymphatic dissemination in cancer. The appearances presented by effusions into the larger joints could readily be simulated and recorded by filling the synovial cavities with mercury, although probably the weight of the metal would somewhat modify the appearances. But it is useless to mention further directions in which such investigations may be pursued; they are sure to suggest themselves to those who are interested in the matter.

#### IV. ORIGINAL COMMUNICATIONS

##### I. NOTE ON THE PHYSICS OF THE CRANIAL CAVITY

By ALEX. JAMES, M.D., F.R.C.P. Ed., Physician to the Royal Infirmary,  
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IN this paper I do not intend to enter upon anything like a full discussion of the question of cerebral physics. The subject is a large one, and the literature is very extensive. I propose simply to ask attention to some items in it which are of very great physiological and clinical importance, and which, I believe, merit more consideration than is usually allotted to them.

*Physiological.*—Brain tissue is a tissue in which continued metabolism is of the greatest importance. Cut off the blood supply to the brain, and we have sudden, complete unconsciousness, ligature the vessels going to the cord, and there occurs



sudden paraplegia. Inasmuch as in the capillaries of the brain and cord, as in capillaries elsewhere, the blood pressure is at its minimum, it is absolutely essential that the tissues of the brain and cord should be guarded from any pressure. In the brain, in which I propose to discuss the conditions, this is brought about by—

(1) The unyielding osseous case, which prevents any external pressure tending to empty the capillaries.

(2) The strong walls of the large venous sinuses which prevent the contained blood pressing unduly on the brain substance.

(3) The vertebral and carotid arteries in their course to the circle of Willis, having to pass through bony canals, by which the brain is guarded against injurious over-distension of its arteries as the result of increased cardiac action.

But now all these, and more especially the unyielding osseous case around the brain, cause it to be under different physical conditions, from what we find in other tissues or organs. It follows, therefore, that we must suppose that special conditions pertain in the brain in connection with its arterial blood, venous blood, and cerebro-spinal fluid. We all know the old simile of the beer-barrel, that when it is full we cannot increase its contents, and that we cannot get any beer out unless we at the same time let air in. We all know, also, the old experiments of Monro and Kellie, demonstrating that the quantity of fluid in the cranial cavity is practically invariable. Such being the case, we can understand that increase in the amount of arterial blood must have associated with it diminution in the amount of venous or of cerebro-spinal fluid; increase in the amount of venous blood must correspondingly have a diminution in the amount of arterial or of cerebro-spinal fluid; and increase or diminution in the total amount of blood must have a corresponding diminution or increase in the amount of cerebro-spinal fluid.

Now, much has been written on the subject of this inter-relationship as regards quantity of these fluids. It has been supposed that alterations can occur in the size of the large venous sinuses, that there occurs ebb and flow of the cerebro-spinal fluid in the cranial cavity, or that there may occur very readily effusion and reabsorption of cerebro-spinal fluid. But what I desire first to say is that these conditions and their

interactions are not all so peculiarly necessary as they might appear to be. This is, I maintain, because the total amount of blood in the cranial cavity is, under normal conditions, practically invariable, the difference from time to time being mainly one of the relative amounts of arterial and venous blood. Let me, in the first place, say a little on this subject.

Realising the importance of the functions of the brain, one is apt to imagine that its vascularity will be correspondingly great. This, however, is not the case. For example, whilst in the liver the amount of blood is about 30 per cent. of the weight of the organ, and in the kidney about 12 per cent., in the brain it is only about 5 per cent., its proportion being similar in this respect to what obtains in muscle.

Next we must remember that the experiments of Hill and Nabarro show that oxidation processes in the brain are not very active, and that most experiments indicate that the temperature of nerve tissue is not much raised by activity. Here let me, however, make a slight digression to point out that it must not for a moment be supposed that the less active oxidation in nerve tissue, as compared, for example, with gland or muscle, should in any way diminish our estimate of the importance of nerve metabolism. I cannot now enter into the question of the different kinds of metabolism, but to illustrate my meaning I need only call to mind the facts that the best electric batteries give off the least heat, and that the best engines are those which transform the greatest proportionate amount of the potential energy of their fuel into work. In nerve metabolism the arrangements and rearrangements of molecules necessary for the development of neurility are extremely rapid, and it is probable also that the mechanical equivalent of neurility is very high, but it is not surprising that the ordinary oxidative changes should be found to be comparatively slight.

Again, it is not unreasonable to believe that there is no great variation in the total amount of blood in the brain in periods of activity and inactivity. When we are actively using our brain, we are not using every part of it equally. This is shown by the fact that a change of mental effort is as beneficial as a rest. Indeed it may be said that the more intense cerebral activity is at one part of the brain, the less active is it at others. Hence, then, active mentalisation is not

necessarily associated with increase in the total amount of blood. In sleep, which has been regarded as the diastole of the cerebral beat, catabolic processes are probably lessened, so that what we call consciousness is not evoked. But we have to remember that although catabolism may be lowered, it does not follow that interchanges between blood and tissue are correspondingly slight. Just as we believe that in the diastole of the heart, anabolic processes are in excess, so will it be during the sleep diastole of the brain. Indeed, it is probable that during sleep, brain anabolism is relatively more active than is the heart anabolism of the diastole. This is because in the heart the diastole is longer than the systole, whilst in the brain it is shorter—in the adult the period of sleep being eight hours out of the twenty-four.

From all these considerations, then, the conclusions which we are entitled to draw are—that the total amount of blood in the brain is not great, and that this total amount varies very little from time to time. Variations in the activity of cerebral metabolism are associated with variations in the relative amounts of arterial and venous blood. This means simply variations in inflow and outflow of the blood, and we can, I think, readily understand this when we call to mind the great afflux of blood to muscles during activity, and the fact that the plethysphgmograph applied to a limb shows not only no increase in bulk, but even a slight diminution as the result of muscular contraction.

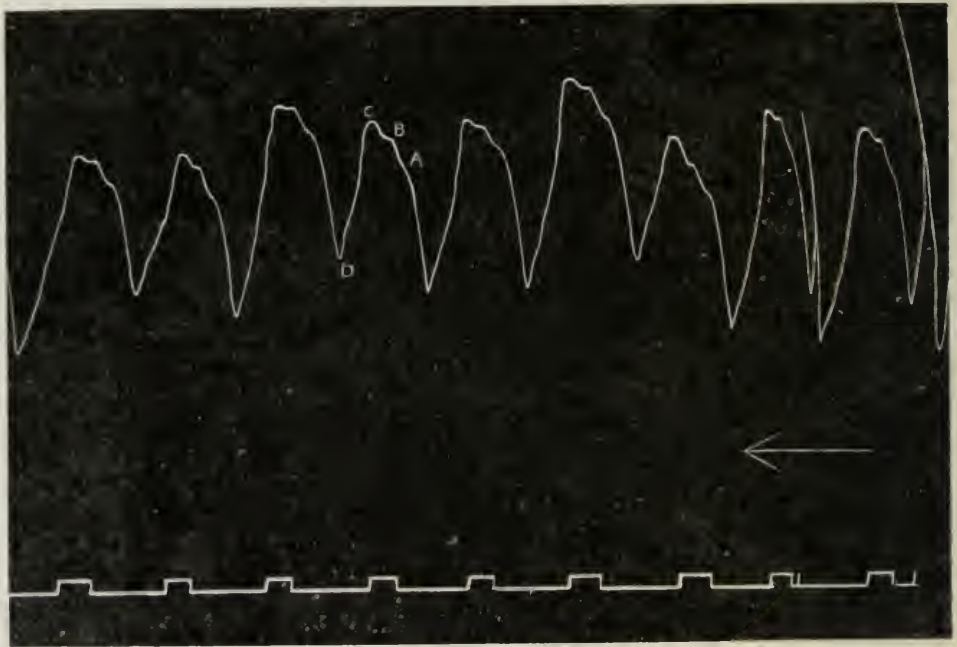
Next, I think we are apt to get an exaggerated notion as to variations in capacity of the cranial contents from the examination of the movements of fontanelles in children or of the brain substance in trephine openings. The extent of the up and down movement in such localities is very great, and so we are apt to suppose that there must occur all through the brain a correlated ebb and flow of blood or cerebro-spinal fluid. But we have to remember that the movement at the fontanelles or trephine openings is great simply because there is very little resistance at those parts, and that elsewhere over and through the brain the amount of movement will be very slight indeed. At present I have in my ward a boy with a large piece of bone wanting in the antero-frontal region of his skull, and I append several tracings which I have obtained of the movements found there. This is not the occasion to enter into a detailed dis-

cussion as to the interpretation of such tracings, but there are certain points upon which these tracings may throw some light, and to these I shall shortly refer.

The first tracing, A, is one taken when the boy was seated quietly in a chair, and with it is given a chronograph tracing showing seconds.

The second tracing, B, shows the effect of weighting the lever of the recording tambour.

The third tracing, C, represents the changes which forced expiration produces. At x the boy was told to blow as powerfully as he could.



TRACING A.

In all these tracings four slight undulations will be more or less easily recognised a, b, c, d, and in all, the last of these, d, is the least marked. In all of them also the anacrotic character of the wave is manifest. As already stated, I do not intend to consider now the precise interpretation of these cerebral tracings, but what I think they suggest is—(1) That the anacrotic character is not due to the transmission of an auricular wave to the veins of the skull. Were this so, the wave *a* would more rapidly disappear, by weighting the lever, as in B, or increasing the venous pressure by blowing, as in C. (2) That the anacrotic character may be due to the fact that the arteries of the skull, vertebrals and internal carotids, pass through rigid bony canals

before entering it. It has been shown that a tracing from the radial artery can be made to take on a somewhat anacrotic character if the vessels above are pressed upon, and although it is not to be supposed that the vertebrals and internal carotids are really constricted by the bony channels in which they run, yet the sectional area of those channels is very small compared with the large extent of cerebral capillary and venus sinus areas beyond, and there is no doubt also that in certain conditions the elastic yielding of the arterial walls may be impeded.

As seen in tracing C, even when the boy was blowing vigorously, undulations are shown, as at y. I have ascertained, by a water manometer applied over the trephine opening in this case, that the pressure required to obliterate these undulations is 5 ft. of water. We do not know what is the arterial pressure in the circle of Willis in man, but from analogy we are, I think, entitled to assume that it is somewhere about 5 or 6 ft. of water. I have tested this pressure in other two cases of trephine openings. These were patients who had been trephined for cerebral tumours. In both of them pulsation was distinctly manifest with a head of 3 ft. of



TRACING B. AT X THE WEIGHTING OF THE LEVER WAS BEGUN.

water, but I could not use higher pressures on account of the pain so produced.

From the point of view, then, of the pulsations of the brain in fontanelles or trephine openings, I think we may assume that in normal conditions the extent of the movement is very slight indeed, and that any movements can easily be allowed for by alterations in the amount of blood in the venous sinuses.

*Clinical.*—To insure a continuous supply of blood to the brain we have the four large arteries at the base forming the anastomosing circle of Willis. The advantages of this anastomosis are well known, but, owing to certain conditions there



TRACING C. AT X THE PATIENT WAS MADE TO BLOW POWERFULLY.

are, in localities in close proximity to this circle, risks greater than elsewhere of the occurrence of the three main causes of sudden disturbance of brain function, embolism, hæmorrhage and thrombosis.

Embolism is commonest in some of the central branches of the left middle cerebral, because the left middle cerebral artery is much on a line with the left internal carotid, and the left internal carotid rising from the highest part of the arch is much on a line with the ascending aorta.

Hæmorrhage is most common in branches of the middle cerebral because, owing to its close connection with the large

arterial trunks, these branches are most exposed to strain and rupture.

Thrombosis also is very common in these branches, because the continued strain is apt to lead to atheromatous changes in their inner coats, and consequent roughening and tendency to clotting.

But a point which I wish to emphasize is that thrombosis may occur, not as the result of changes in the blood vessels, but of changes in the blood. Under this head come the so-called cerebral hemiplegias of children, the hemiplegias of anæmia and of debility, and the post-febrile hemiplegias. It will be at once evident that the mechanical conditions which cause the hemiplegias from hæmorrhage, embolism, or atheromatous thrombosis to be most frequent about the central branches of the middle cerebral, do not apply to these forms. Not only this, but the activity of the circulation in those vessels must tend to diminish the chance of blood coagulation occurring in them. Hence we can understand that the thrombosis which leads to the cerebral hemiplegias of children, anæmia, etc., should be decidedly more frequent in vessels at or nearer the cortex of the brain, where the circulation is correspondingly less active.

A slight acquaintance with the physics of the cranial cavity enables us to understand how a hæmorrhage into the brain is, from the purely mechanical point of view, much more serious than a hæmorrhage into any other tissue. The extravasated blood, flowing as it does from a ruptured artery, is at a pressure higher than the capillary pressure of the brain substance around. Owing to the unyielding osseous case, room for the extravasated blood can be made only: (1) by emptying the capillaries around; and (2) by pressure on the venous sinuses. But this pressure on sinuses and capillaries means impairment or abolition of brain function around, and as brain capillaries are very small, this means that a bleeding of no great size empties capillaries over a large area of brain. We recognise here also the advantage of the strong and tense membranes, the Falx and Tentorium. These will limit the extent of the capillary areas deprived of blood by mechanically withstanding the pressure. We can understand also how a hæmorrhage under the Tentorium will be specially dangerous.

Here it will be at once evident that the formation of a trephine opening might, in cases of hæmorrhage, be of benefit. By allowing a certain amount of brain substance to project through the opening, it is conceivable that capillaries, hitherto closed, might be rendered patent, and that so brain function might be so far restored. But, as Leonard Hill has pointed out, the trephine opening must be sufficiently large.

The next feature of importance in connection with diseased conditions that I wish to draw attention to, is that hæmorrhagic extravasations or patches of softening in the brain, if of any size, heal by the formation of a cyst. This is a very important point, and I wish now to devote some time to its consideration. The cause of this healing by cyst is mainly the unyielding osseous case around. As the result of the hæmorrhage, or of the softening, a certain amount of brain tissue has been destroyed. This must, of course, be reabsorbed, but whilst elsewhere lost tissue means a cicatricial puckering of the parts around, this cannot occur in the brain. In this respect, brain tissue much resembles lung tissue, and just as loss of substance in the lung is apt to mean a cavity or a dilated tube, so loss of tissue in brain means a cyst.

But the comparison, as regards mechanical conditions, between brain and lung can be carried a little further. Thus in the lung, when as the result of loss of tissue a cavity is formed, and when in the walls of that cavity a small artery is laid bare, there tends to be formed on that artery a little dilatation, a miliary aneurism. This aneurism is, as is well known, ascribed to "want of support" at the part, and this is to a large extent true, but it is no less true that a factor which must also aid importantly in its formation is the negative pressure which pertains in the cavity itself. Owing to the but little yielding of the thoracic walls, and owing to the out-dragging tendency of the fibroid tissue around, this negative pressure will always, except during coughing, be acting. It will be increased with each inspiration, and still more increased if as the result of bronchial catarrh there is any obstruction in the tube or tubes which lead to it.

Now a similar mechanical condition exists in the brain, when as the result of advancing age the cerebral tissue is failing as regards trophic power. The "lean and slippered pantaloons" presents "shrunk shanks" as evidence of this progressive loss



of trophic power, but his bony skull cannot shrink, and so the lessened trophic power and diminishing bulk of his brain must be allowed for in other ways. A larger proportionate amount of blood, a larger quantity of cerebro-spinal fluid with dilated ventricles (senile hydrocephalus), progressive thickening of the membranes will all tend to help in this process, but the formation of miliary aneurisms must, I think, be regarded as in part a consequence of the same mechanical condition. All the more, too, when we take into consideration the weakened walls of the vessels and the relatively high arterial pressure.

We can further understand how, as the result of this tendency to negative pressure in the cranial cavity with advancing age, a vicious circle readily becomes established, for one miliary aneurism having burst, the reabsorption and cicatricial encapsulation of the blood and destroyed cerebral tissue, must act so as to still further increase this tendency to negative pressure, and so favour dilatation and rupture of the vessels around. Each hæmorrhage increases the liability to a subsequent one. Theoretically, therefore, we may say that a large trephine opening might be useful not only in cases of fresh hæmorrhage, but at later periods as well. In the former cases it might, as has been stated, relieve positive pressure and open up capillaries, in the latter it might relieve negative pressure and promote shrinking and cicatricial encapsulation at the site of the clot.

Next as regards General Paralysis. When, as seems most reasonable, we regard this as being, as it were, a premature brain senility, a too early using-up of the trophic power of the cerebral tissue, we can readily, on purely physical grounds, explain many of its morbid appearances. The power to elaborate the highly complex cerebral tissue being impaired, the more simple fibrous tissue takes its place and progressive shrinkage ensues. The tendency to negative pressure is thus established; and hence follow thickenings of the membranes, dura, arachnoid, and pia, and even bony thickening of the inner surface of the skull. Hence follow also the formation of the so-called false membrane under the dura, and the accumulation of fluid under the arachnoid, the dilatation of the ventricles, and of the perivascular spaces, etc. Whilst admitting that in general paralysis other causative forces are at work, and other morbid changes occur, there is no doubt that all those just mentioned

can easily be accounted for mechanically by progressive atrophic changes in the cerebral tissue.

I have not had much experience of the practical results of trephining in general paralysis, but theoretically it appears to me that, although this procedure can in no way influence the progressively downward course of the disease, yet we must admit that by rendering the shrinkage more easy, it may exercise a beneficial effect on some of the secondary symptoms. To do this, however, the trephine openings would require to be large and probably also bilateral.

Lastly, as regards tumours of the brain. These being of slow growth, interfere less actively with brain function. This slighter interference is all the more marked because other parts of the brain may take up the function of the part involved. Concerning surgical interference in brain tumour, there are only two points which I wish to refer to. The first is that when a tumour of any size is to be removed by operation, it would seem desirable to have a large opening, and to have plenty of soft tissues to permit of falling in. The second point is that when trephining is employed simply for the relief of headache, it is possible that the lessened intra-cranial tension which brings about the relief of the headache, may permit of increased rapidity of growth on the part of the tumour. We know that though, pathologically, tension often acts as an irritant, yet that in the case of growth and reproduction among lower forms of life, it may act as a deterrent. Practically, in cases of cerebral tumour trephined for headache relief alone, I have often been struck by the distinctly more rapid downward progress of the case after the operation.

## 2. THE IMPORTANCE OF ASEPSIS IN GENITO-URINARY SURGERY

By DAVID WALLACE, F.R.C.S. Ed., Assistant-Surgeon, Royal Infirmary, Lecturer on Surgery, Edinburgh

IN December 1883 the late Sir Andrew Clark, at a meeting of the Medical Society of London, read a paper provisionally entitled "Catheter Fever." At the outset he alluded to a case which he said left an impression upon his mind which had never been effaced. In 1850 a medical officer of the Haslar Hospital asked him to examine his urine. He did so, and

only found that "it was too great in quantity, too low in density, and too pale in colour." Sir Benjamin Brodie examined the patient, drew off a large quantity of urine from the bladder, told him he was suffering from simple enlargement of the prostate, and prescribed the regular use of the catheter. In a week the patient was free from local discomfort, but began to feel and look ill. He died in three weeks from the beginning of his illness. No *post-mortem* was allowed.

In 1865 Sir Andrew saw another case, the story of which, he said, resembled the first, but in which a *post-mortem* was got, but revealed nothing sufficient to necessitate, or account for death. The prostate was enlarged, the bladder was dilated and thickened. Viewed from the inside it was trabecular and slightly saccular; the mucous lining was congested and in part eroded, and everywhere coated with a greyish white stinking mucus. There was nothing detected in the urethra or in the kidneys although they were carefully examined. Mr Peter Marshall and Sir Andrew Clark, who made the *post-mortem*, "could say nothing more of the cause of death, than that it was due to irritative fever."

After a retrospect of the work which he had been able to find on the subject, Sir Andrew, in a series of propositions which he laid down for the consideration of the Society, especially drew attention to what he said was the favourite view regarding these cases—viz., "that they were neither uræmic nor pyæmic, although having some of the characters of each. Probably the condition begins in the nervous system. Probably the disturbance of the nervous system reacts in the first instance upon the general metabolism of the body, and in the second instance upon the secretory organs beginning with the kidney." He stated that every writer of distinction adheres to the view of the uræmic origin and nature of catheter fever, but that he opposed it. He ended the paper by remarking that two questions of a practical kind arose.

1. Seeing that by almost universal assent the fever originates at least in a disturbance of the nervous system, and seeing that there is no account of the fever following in cases where narcotics or anæsthetics have been used may it not be that the fever is capable of being cut short by the administering of these on the commencement of catheter life.

2. Quinine fails to control the fever. What drugs may

be employed—what sort of hygienic management should be followed, especially in order that the fever may be brought, if it be possible, to a successful ending?

In the discussion which followed this paper Sir Henry Thompson, Mr Berkeley Hill, Mr Savory and others took part. Sir Henry Thompson objected to the term catheter fever, and thought the term used by Velpeau of "urinary fever" was more appropriate. He formulated three distinct varieties of urinary fever.

1. *Acute transient attack*.—"A form which occurs four or five hours after instrumentation, and in which a severe rigor occurs, followed by dry heat and pains in the back, and then sweating. These symptoms pass away slowly—no recurrence takes place, and the patient, after two or three days, is as well as ever." He explained it by the absorption into the blood-vessels of some small portion of urine, and the attack as a storm produced by nature's effort to get rid of the poison.

2. *Acute recurring form*.—In which, after a similar condition as in the acute transient form, we have recurrences at intervals of two or three days, but after four or five attacks they cease and the patient recovers.

3. *Chronic or continuous urinary fever*.—In this, the last variety, Sir Henry placed the two cases quoted by Sir Andrew Clark. He then alluded to cases in which, after forty-eight hours or less from the time of the catheter being passed, the patient dies. These, he said, are not due to urinary fever at all, but to shock of some kind, and to bear out this view he referred to the close relation of the urethra and genito-urinary tract with the nervous system, as evidenced in the shudder after micturition, faint from passage of bougie, or it may be epileptiform convulsion, or it may be even death.

Then he remarked that in all cases of this chronic relapsing form, associated with long-standing obstruction to the urinary flow, there is advanced renal disease, and he finished his remarks by stating that it is only when great distension of the bladder is present, and has been for long that such bad effects are got from catheterisation, and that these may be enormously reduced by rest and warmth before, during, and after the first catheterisation.

Mr Berkeley Hill corroborated this last statement of Sir Henry's and was, for doing so, severely taken to task by Sir

Andrew Clark, who stated that, in the second case he referred to, the kidneys were perfectly healthy.

Mr Savory drew attention to the influence of micro-organisms and laid stress on the importance of the quantity of urea secreted in relation to all operative procedures.

In February 1884 Sir Andrew Clark addressed the members of this Society upon the subject of catheter fever, and almost at the outset made the following statement:—"It is admitted that the introduction of the catheter is occasionally followed by severe constitutional disturbance, that occasionally this disturbance ends in recovery, but that sometimes it ends in death and then,—and here I repeat is the crucial question of the whole discussion—it is alleged that if it ends in death, renal disease existed before the catheter was introduced, and that death is caused by uræmia, in consequence of extension of the renal disease. Now I demur to this conclusion, and I traverse its accuracy." After a repetition of much of what he said in his first paper he amplified his conclusions or belief of the cause of catheter fever, and gave the following four stages in its evolution :

1. A direct or reflex irritation of the nervous system.
2. That this causes disturbance of metabolic processes in the body.
3. A septic infection occurring or begotten inside or outside the body.
4. Occasionally the sudden diminution of pressure, by the removal of a large quantity of urine from the bladder brings about such a change in the constitution of the vascular supply, and the nervous state of the bladder, ureter and kidneys, as sets in motion all those disordered metabolic processes which lie between the nervous disturbance on one side, and visible structural lesion on the other.

In the discussion which followed, the various speakers seemed to unite in a two-fold expression of opinion.

1st. That the nervous system played a very important part in the condition, and 2nd., that micro-organisms of septic properties were the chief cause of the condition.

In regard to the second factor it was pointed out, however, that even with care in purification of the catheter to be used, and the avoidance of injury to the urethra, yet such cases, of what Sir Andrew Clark termed provisionally "catheter fever,"

and Sir Henry Thompson preferred to term "urinary fever," did occur with considerable frequency.

Throughout the discussion, both in London and Edinburgh, I think we have to note certain factors of importance which have a bearing on the subject, viz. :

1. That the condition of fever described in the cases quoted by the various surgeons and physicians was almost identical in all.

2. That the cases were almost universally, in persons who suffered from residual urine, due to some obstruction at the neck of the bladder or in the urethra.

3. That the patients were invariably males. Dr Heron Watson said he never saw a case in a female—indeed never met with a rigor after catheterisation in a female. A statement which is of much interest in relation to the cause of, 1st., transient urinary fever and 2nd., the continuous form to which I wish more particularly to draw your attention. Dr Milne Murray corroborates Dr Watson, and states that he never knew of a rigor in the female after catheterisation in his own practice.

4. That in some cases, in which death occurred there was great hypertrophy of the bladder wall, and dilatation of the ureters, while in others there were no such conditions.

5. That frequently the urine before the use of the catheter was too large in quantity, *e.g.*, 120 ounces per diem.

6. That where precautionary measures were adopted, before and after catheterisation, the condition was less frequently observed.

7. That on *post-mortem* examination in some cases, no evidence of structural change was observable in the kidneys.

Further we may note that Mr Reginald Harrison, Sir Henry Thompson, Mr Annandale, and others, laid stress on the quantity of the residual urine and the duration of the condition, and indicated that probably the sudden relief of pressure caused changes in the bladder wall, and perhaps higher. Mr Harrison pointed out that by the injection of an antiseptic fluid to prevent this, he had succeeded in avoiding the occurrence of such cases in his practice. The fluids he used were weak antiseptics, if antiseptic at all, viz., salt and warm water, or a solution of sanitas. He used them for the mechanical purpose of preventing bad effects by too sudden collapse of the bladder wall.

From these remarks you will observe how the subject of urethral fever was regarded in 1884, but I may sum up the position in the light of our knowledge at present, by saying—

1st. That the rôle of micro-organisms was not then appreciated at its true value, although they were believed by some to have an influence.

2nd. That the nervous system was believed to have a very important influence on the condition, and measures were in particular directed to counteract this influence, while that of the micro-organisms was in great part neglected.

Now I would ask the question : Do we, while recognising the importance of the nervous system, use sufficient precautions, or the proper precautions, to prevent the direful result of the micro-organism cause ?

To our knowledge of the part played by organisms in cystitis, much has been added recently, and it is now generally admitted that the fateful part they play cannot be over-estimated. The so-called continuous urinary fever seen after instrumentation is an organismal condition, and much light has been thrown upon the subject by the clinical and experimental observations made in relation to cystitis.

That the nervous system, alone or in association with mere mechanical causes, does not give rise to the series of effects noticed in such cases of urethral fever, and that something further is added, is, I think, proved by—

I. Grave renal disease is not always associated with the condition, even where it proves fatal, and complete recovery occurs in some cases—it may be after further and more severe surgical procedure—although these have manifested all the symptoms of urethral fever.

II. Serious operative procedures in relation to the genito-urinary tract, may be carried out in cases of advanced kidney affection without any bad result (*v.* Albarran on “Secondary Infections in Urinary Tubercle”).

III. There are changes in the urine not merely as regards the actual amount, or the quantity of urea, but pus and micro-organisms are present.

IV. Marked improvement results from washing out the bladder—the injection of antiseptics, the use of iodoform emulsion, or operative treatment.

V. Not infrequently, although the serious symptoms are so far recovered from, a condition of septic cystitis remains.

These various points are in part inferential, but we have direct evidence of the important part played by organisms from—

1. The organisms found.
2. The history of the case in the light of the known effect of organismal action.
3. As the organisms are got rid of, the condition of the patient improves.
4. Interstitial suppurative nephritis may be found in one or both kidneys in patients who die.

To focus some of these points I may quote the following case which occurred only recently in my own experience.

I saw Mr A., æt. sixty-five years, in December 1896. He suffered from hæmaturia which had been intermittent, and accompanied by no other symptoms. There was no frequency of micturition. He did not require to rise during the night. The hæmaturia first appeared in June 1896, that is, five months before I saw him. He then had bleeding without any cause, and unaccompanied by any pain or other symptom. It continued for a fortnight and then passed off, but recurred in six weeks, when it lasted for a week. When I saw him he had profuse bleeding but no clots, the blood was intimately mixed with the urine and dark in colour. Careful enquiry failed to elicit any other symptom. The prostate per rectum was not enlarged. He had never had retention, and no instrument had been passed along the urethra. The history was just that which I would expect from tumour of the bladder, and I made the provisional diagnosis of tumour. I advised that nothing surgical should be done until the bleeding ceased, but that then he should come into town and be examined cystoscopically. That in the meantime he should be kept at rest in bed, and have a light dietary with plentiful bland diluents to drink. The bleeding ceased, and he came under my care on December 10th. I again carefully went into the history, but failed to elicit anything further. He did not rise at night, and I found that he passed from 10 to 15 ounces of urine at each micturition, and in all passed 40 ounces of urine per diem. It was acid, and contained a few red blood corpuscles, but was otherwise normal. On 11th December, with strict antiseptic precautions,



I drew off his water as the first step towards cystoscopic examination, and found that although he had passed water a few minutes previously, and as he thought, emptied his bladder, that there were 17 ounces of "residual" urine. Cystoscopic examination showed the bladder to be healthy, and no cause for the bleeding was detected.

*The urine* drawn off contained some dark brown sediment which, on microscopical examination, proved to be broken-down blood clot.

I told his medical man, who was present, that it was just such a case in which septic infection was to be dreaded, and advised that, even though no bad result accrued from the examination, the patient should stay in town for three days in case sepsis should be manifested. In no way did the patient suffer for two days. In every respect he was well, and the urine after the first twelve hours was the same in quantity as before. It was acid and quite clear; but on the morning of the third day the patient's temperature had risen to 99.8. There was slight headache, loss of appetite, and malaise.

*Progress and Treatment.*—At 12 noon on the third day the temperature was 100.8, pulse 93 per minute. He was very restless, had no appetite—tongue furred and dry. On the following morning temperature 101.6, and by 2 P.M. 103.4; and he was a little delirious at intervals. The day previously he was given 5 grains of quinine every four hours, but during the night and succeeding day he got 10 grains of salol at intervals of four hours. I passed the catheter and drew off 17 ounces residual urine on the evening of the third day, and on the following days I drew off the water twice daily, the quantity varying from 16 to 20 ounces each time. The total quantity daily was 33 to 38 ounces. He had no local discomfort. The urine was cloudy and contained a small quantity of pus. At each time of catheterisation after the urine was withdrawn I injected half an ounce of sterile iodoform and mucilage with an equal quantity of boiled water (10 grains of iodoform).

The temperature gradually came down, and on the morning of the fifth day it was 100.2, in the evening 98.4. Next morning, that is, the sixth day after the first passage of an instrument, the temperature was 99.2, and for the next two days it did not rise above 99.2. The malaise passed off: the

appetite improved. The urine remained practically of the same character—no increase in pus, and acid in reaction. The quantity per diem was as before, nearly 40 ounces. He was so well that I allowed him to go home; the doctor having agreed to carry out the treatment on the same lines as I had adopted. The urine, on the fourth day after examination, was examined for organisms. I drew it off into a sterilised tube, and cultures were made by Mr Stiles and Dr Kenneth Douglas, who both found the *staphylococcus pyogenes aureus* in the specimens.

The patient's after history was much what was to be expected. Recurrence of high temperature, and of the general constitutional symptoms characteristic of septic absorption. He became delirious, the local symptoms became troublesome; he had constant calls to micturition, and the pus in the urine in spite of treatment increased in quantity. The washing out was used more frequently, but as it was possible that the iodoform was the cause, or at least in part the cause, of the delirium it was stopped. He did not improve, and on 31st December, three weeks after the first instrumentation, I performed suprapubic cystotomy. The bladder wall showed nothing peculiar. It was thin—no rugosities. The prostate was not unduly large. I introduced two large tubes and advised frequent washing out. Locally this gave great relief, but the mental symptoms persisted for some weeks. Gradual improvement, however, set in—the wound healed, and the patient, I am glad to say, is now better. The catheter is not required. He has no frequency, and is in his usual state of health.

In this case I have not the least doubt but that the untoward symptoms were solely due to organisms, introduced into the bladder at the time of the examination. The patient suffered no inconvenience from the examination either during its performance or immediately after: the urine remained perfectly clear for 48 hours, and the fever and constitutional symptoms came on at the same time as the urine showed signs of sepsis, viz., 72 hours after the examination.

The case resembles in its course, at least in the early stages, others which I have met with, and except that it was slighter than those described by Sir Andrew Clark and ended favourably, I think may be classed along with his cases.

In such a case, as Bouchard, quoted by Keyes, says, "Not

only does a bacterium accidentally come in contact with a man, but with a suitable soil and favourable conditions," so that the bacterium grows and multiplies. Septic urine which cannot be thoroughly voided results, and we have toxæmia resulting from septic absorption. How can this result of catheterisation or other instrumentation be avoided?

Melchior (whose work upon cystitis and urinary infection is perhaps the most valuable upon the subject) had the greatest difficulty in getting specimens of sterile urine. When he used the ordinary methods recommended by other workers he found that the majority of specimens contained organisms, and it was only after adopting special precautions, in addition to those recommended by others, that he was able to draw off sterile urine from the bladders of healthy persons. From his experiments and from the difficulties encountered by others, as for example, Lustgarten and Mannaberg, he concluded that the impurities were due to the urethra and not to the urine.

The inference from his experiments is that there are, as Keyes and others have stated—apart from the organisms under the prepuce and around the meatus—organisms in the urethra itself, and that these organisms are pushed into the bladder by the instrument, and inoculate the urine.

In cases where the urine cannot be freely voided—*e.g.*, in enlarged prostate, these organisms remain and produce sepsis. In many cases, as shown by Albarran, Halle; and Krogius, the organism present is the bacillus coli communis; but in some it may be one or more of the ordinary pyogenic organisms, as in the case I have quoted the *S. pyogenes aureus*.

Why, it may be asked, do the organisms, if present in the urethra, not pass into the bladder at other times? Guyon states and Keyes agrees, that the compressor urethra may serve to shut off the passage, or at least render the passage more difficult. The bladder, as Guyon states, when healthy, is the guardian of the ureters and kidneys. The deeper part—membranous and prostatic—of the urethra, normally aseptic is the guardian of the bladder. If the bladder be unhealthy, we have the contagion passing along the ureters, and suppurative interstitial nephritis may result. But if organisms are present in the bladder, and the urine not completely evacuated at each act of micturition, we may have general symptoms of septic intoxication from absorption, although the kidneys are not

affected. Symptoms are produced which, in the later stages, resemble these we note in cases of septic peritonitis, although not so profound and rapid as a rule. This similarity of symptoms may be due to those bladder cases, as proved by Melchior, Albarran and others, in many instances being produced by the bacillus coli communis.

How can infection be prevented?

Until quite recently, the measures taken have been those recommended fifteen or more years ago—viz., purification of the instrument used, and the use of an aseptic, or antiseptic, but unirritating lubricant, together with, it may be, the empirical administration of quinine or antipyrin before or after instrumentation. At the same time, an endeavour has been made to keep the patient warm in bed before, during, and after instrumentation.<sup>1</sup>

By such measures we try to ensure that the instruments we use will be aseptic—we try to minimise the nervous conditions upon which the older surgeons rightly put much stress, but we neglect to purify what is probably one of the chief sources of urinary infection—viz., the meatus and its immediate neighbourhood, together with the anterior part of the urethra. We have to deal with a cavity which contains aseptic urine, but urine which is readily liable to septic infection.

In general surgery we admit that “if suppuration occur in a wound made by the surgeon through unbroken skin, it is due to some oversight on his part” (Cheyne). So, too, I think, we must admit that if sepsis occur in the bladder after the passage of an instrument, it is due to some oversight on the part of the surgeon. When we operate on unbroken skin, we purify it thoroughly for some distance around—we surround the part to be operated upon with sterile or antiseptic towels. I think, when we pass an instrument on a patient who has aseptic urine, it behoves us to take similar precautions appropriate to the region—not merely to purify our instruments—turn down the bedclothes, and introduce the catheter. In every particular, we ought to use precautions analogous to those adopted in other

<sup>1</sup> Dr Wyllie, long ago, in 1869, advised that the hand should be kept pressed over the suprapubic region, to prevent the sudden indrawing of air, and believed that these toxæmic conditions were organismal. This view was from that date strongly advocated by Professor Chiene, and taught in his class of Systematic Surgery. (2. “Med. Chir. Trans.” Ed., 1884).

operative procedures. I think this should be done as a routine, but in patients where the urine can be completely voided by the patient, it is not so necessary ; as, even if organisms be introduced, they are quickly evacuated at the next act of micturition. Yet even in such cases, from time to time, we meet with cystitis which is very troublesome. I have recently seen it in two females after operation. In one patient after ligature of internal hæmorrhoids, retention followed, and catheterisation was required for three days, at the end of which time a septic cystitis was present, with pain, frequency of micturition, and pus in the urine, which necessitated special treatment for one month. In this relation, I may say that I think the gum elastic catheter should be wholly discarded by nurses, and replaced by either a silver catheter, or a red rubber instrument, both of which can be readily and thoroughly purified. It may be said that the nurse would have difficulty in using the red rubber, and might do harm with the rigid silver instrument—my answer is, that it would be better to find the urethral opening by inspection, than run the risk of sepsis. I go further, indeed, and say that, to find the urethral opening in the female by touch is an error. The patient should be turned on her side, the meatus and surrounding parts of the vulva should be carefully purified, and the instrument introduced with the minimum risk of contamination.

Melchior quotes several cases of cystitis produced in this way, and if it can occur in the female bladder, which can be so thoroughly emptied, how much more easily may it be produced in the male. In tubercle of the bladder, it is undoubted that secondary septic infection is fraught with the gravest results,—not merely an aggravation of the symptoms, but a hastening of the fatal result. I believe that the later and chief symptoms in tubercular disease of the bladder are due to septic cystitis, more than to the tubercular disease. (Albarran, “Annals des Mal. des Org. Urin.” Tome xv.)

In the simplest instrumental operative procedure in bladder surgery, I am of opinion that in addition to thorough purification of our instruments we should use precautionary measures to avoid sepsis just as in operations upon unbroken skin, and that to do this the meatus and glans should be carefully purified. When we have to deal with bladder affections as, for instance, tubercle, or tumour, or retention from any cause,

I am satisfied that this advice is sound advice. The treatment Melchior recommends may be, as he states, heroic treatment, but if it succeeds it well repays the surgeon any extra trouble entailed. He advises :—

1. To wash the meatus and glans with 1-30 carbolic, and then with boracic lotion.

2. After the withdrawal of the urine, the injection of one drachm of a two per cent. solution of nitrate of silver solution, which should be left for five minutes in the bladder and then allowed to escape, after which the instrument is withdrawn.

This latter part of the treatment is certainly heroic, but in his hands has been successful. Can we use any method which will be less painful to the patient, and equally satisfactory?

In the method Melchior used to withdraw sterile urine from the bladder without contamination, he introduced a metal catheter with a terminal but protected opening down to, or just into the bladder, and along it he passed a soft instrument into the bladder. I think this method might be utilised to draw off the urine in cases of prostatic retention, or in retention from blood clots in tumour of the bladder, or in cases of tubercle of the bladder where we wish to use instillations of silver nitrate, or corrosive sublimate, or iodoform emulsion. In place, however, of passing the instrument down to the bladder it might be passed only to the commencement of the membranous urethra, that is, to the end of the septic portion. In this way we would avoid passing an instrument with an open eye along a septic canal into the bladder. We minimise the risk. The outer tube keeps the catheter clear of the meatus at least. Guyon advises washing out the anterior part of the urethra. He uses for the purpose a syringe introduced by M. Janet, which is much on the same principle as the syringe introduced by Teevan for washing the urethra from behind forwards in gonorrhœa.

In cases with residual urine I advise, apart from the use of the above instrument for the withdrawal of the urine, which should be done very slowly, that the bladder should be washed out with a sterile or weak antiseptic solution—(Keyes uses 1-2000 nitrate of silver), and then that some sterile solution should be left in the bladder as Mr Reginald Harrison recommends. In this way I believe the risk of sepsis is greatly diminished.

I do not wish to discuss the question of suprapubic aspira-

tion in cases of prostatic retention as against catheterisation, nor do I to-night intend to allude to the best treatment of sepsis when it has occurred, but I would say that when present we have a source, a manufactory, of poison, and that the treatment, locally, must be very thorough and complete if we wish to modify or arrest the course of the affection.

The point of my paper to-night is :—

1. That in all urinary surgery, organisms may have an important rôle.

2. That in cases where the bladder is diseased or distended, the risk of sepsis being produced by instrumentation is very great.

3. In such cases, if sepsis do occur, the gravity of the condition is profoundly greater.

4. The anterior part of the urethra is a septic canal, but the deeper part is probably aseptic.

5. Purification of instruments is insufficient to prevent sepsis.

6. Precautionary measures should be taken to prevent contamination from the meatus and surrounding parts and urèthra.

7. In retention cases—to minimise the risk of infection—the bladder should be washed out after the withdrawal of the urine.

8. In prostatic cases with residual urine—after the washing out—some sterile fluid should be injected.

Lastly, in the female the catheter should be passed into the urethra by sight, after purification of the meatus and vulva.

#### REFERENCES.

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2. "Edin. Med. Chir. Trans.," 1884 ;
3. Keyes, *Amer. Jour. of Med. Sci.*, 1894 ;
4. Guyon, "Leçons Cliniques sur les Maladies des Voies Urinaires," 1897 ;
5. Melchior, "Cystite et Infection Urinaire," 1895 ;
6. "Annales des Mal. des. Org. Genito-Urinaires," from 1889-97.

**Meeting VIII.—March 17, 1897**

Dr WILLIAM CRAIG, *Vice-President, in the Chair*

This was a special meeting for a limelight demonstration of the plans of a new Hospital to be erected at Colinton Mains by the City of Edinburgh—for the treatment of infectious diseases—and to hear a description of the plans by Robert Morham, Esq., City Architect.

Bailie Pollard, Convener of the Public Health Committee of the Town Council, gave a short account of the steps which led up to the selection of Colinton Mains as a site. The desire of the Committee, he said, had been to carry with them the heartiest support of the medical profession in that very important bit of work. When an extension of the old hospital was proposed some years ago the Committee sought council from the Royal College of Physicians, and he was bound to say they were much indebted for the interest which the Council of the Royal College of Physicians showed in the work they had in hand. The Committee took a limited view of the requirements at first, and were much attached to the old site, and it was only after the Medical Congress of 1895 that they felt at liberty to go further afield.

Mr Robert Morham, City Architect, then described in detail the plans which were thrown on a screen by means of limelight, and invited discussion and suggestions from the members and architects present.

The following is Mr Morham's description of the proposed hospital :—

**COLINTON HOSPITAL****GENERAL DESCRIPTION**

The Corporation of Edinburgh, having resolved to build a New Hospital for the treatment of Infectious Disease, have acquired for the purpose the lands of Colinton Mains, lying to the south-west of the city.



The part of Colinton Mains chosen for the Hospital site lies towards the north-eastern quarter of the property, and slopes gently south-eastwards from the base of Wester Craiglockhart Hill, at an elevation varying from 350 to 400 feet above the sea-level. A little further west than midway along the northern boundary a temporary hospital has been erected, consisting of an administrative block with two wooden pavilion wards. By arrangement with the proprietor of the lands of Greenbank, which bound those of Colinton Mains on the east, ground has been acquired to form an access from Comiston Road, and, from the westward continuation of this road along the northern margin of Colinton Mains, will be the principal entrance to the Hospital premises. On the west an access from Colinton Road, which bounds the property in that direction, leads towards, and partly skirts, the enclosure of the temporary hospital, and thence eastward to the principal entrance.

Within the principal entrance on the left is the porter's lodge, and a little further in on the right the medical superintendent's house. Further within, and directly facing the principal entrance, are the general offices, and in rear of these the stores, kitchen, and dining-room block, and beyond these the nurses' and servants' homes. These buildings occupy a position nearly central in the Hospital grounds, the ward pavilions being arranged in double rows to east and west, those on the east entirely for scarlet fever, and those on the west for the other diseases to be provided for, namely, diphtheria, typhoid, and erysipelas in the north-western, and measles, chicken-pox, hooping-cough, and typhus in the south-western ranges. Reception and observation wards—the latter for doubtful cases—are placed on either side, near the principal entrance, and isolation wards for complicated cases towards the further extremities of the respective groups. At the north-east corner of the grounds is an ambulance station, and near it lecture-rooms, pathological laboratory, museum, and mortuary buildings; further south are laundry, boiler, disinfector, and incinerator buildings. Ample open space is left around for separate recreation grounds in convenient proximity to the pavilions for the several classes of disease, besides airing courts in the intervals between the buildings.

## DESCRIPTION OF SOME OF THE PRINCIPAL BUILDINGS.

1.—*Ward Pavilions.*

*Wards.*—Of primary importance are the wards. These are arranged in separate pavilions, one or more for each class of disease, according to the number of patients to be provided for, and mostly of two stories, the stair in every case so placed as entirely to cut off all direct connection between the lower and upper wards and offices.

The size of the wards is regulated, on the one hand, by the number of patients it is considered can be properly supervised in one ward with due regard to the cubic space to be allowed for each ; and, on the other, with reference to convenient subdivision of the whole number to be provided for in the respective classes of disease, ranging from 320 for scarlet to 10 for typhus fever, the former requiring seven pavilions, while one of the ordinary size would more than suffice for the latter.

*Aspect.*—The pavilions are placed so that the wards may get as much sun as possible, that is, with their length north and south, the ward offices being kept, in most cases, at the north end of the ward, so that the shadow from their greater bulk may not fall on any part of the wards ; and the sanitary provisions for each are placed as far as may be with reference to the same consideration, that is, away from the south end of the wards, so that these may have the full benefit of the midday sun.

Besides the general ward, each pavilion has on each floor one *two-bed* and one *single-bed* ward, for cases requiring separation, or in which treatment in a private ward is desired by the patient. These, with the duty-room, bath-room, linen and coal closets, are arranged at the north end of each pavilion, and beyond the covered corridor are the ward scullery with pantry attached, nurses' dressing-room, with the stairs and lifts from the lower to upper flat.

*Floors.*—The floors are intended to be of fire-resisting construction, the surfaces in the wards being of solid teak plank flooring in narrow widths, closely jointed, embedded in prepared pitch, and impregnated with paraffin wax ; those of the ward passages, and parts generally other than the wards and duty-rooms, being finished in terrazza or polished Portland cement, with large hollow at base of walls and divisions.

*Walls.*—The walls of offices to the height of five feet will be formed with glazed brick, tiles, or other non-absorbent material, and those of the wards with Keene's Adamant or Parian cement, with rounded hollows at all re-entrant angles.

*Heating.*—The heating is intended to be by means of ventilating steam coils, supplemented by central ventilating stoves in the general wards, and ventilating grates of the most improved type in the smaller wards.

*Ventilation.*—While special apparatus for the ventilation of particular parts will be provided, cross ventilation by suitable arrangement of the windows and by adjustable gratings on opposite sides of the wards will be largely relied on.

*Sanitary towers.*—In the sanitary towers attached to the several wards, and in most cases placed in a nearly central position on one side of the ward, there are provided water-closets and slop-sinks, ventilated bed-pan cupboards, and open lattice-work shoots for soiled ward linen, down to carbolic tanks, and in the upper part of the tower an ample cistern chamber.

*Discharging arrangements.*—Discharging arrangements are provided—one near the principal entrance for scarlet fever patients, and one in connection with the pavilions for each of the other diseases.

## 2.—*General Offices.*

These are situated near the principal entrance, and comprise central entrance hall, with telephone and post-office; with medical superintendent's offices on one side, and the matron's on the other; a room for the chaplain, and a mess-room for the medical staff. On an upper story are sitting-room and bedrooms for the medical assistants, and one or two spare rooms.

## 3.—*Store, Kitchen, and Dining-room Block.*

The block comprising the stores, kitchen offices, and dining-rooms occupies a central position on the premises.

*General stores.*—The store building is in two stories, immediately to the north of a courtyard, for the delivery of goods in rear of the general offices. Besides a spacious apartment for *receiving* and *distributing*, there is an office, also weighing-room and counter, a stair for access to the upper

floor, and beyond these a mattress and bed furnishing store and mending room, and to the south of these a dispensary with separate entrances and counters for scarlet fever and other nurses, drug store, and shed for trolleys for the distribution of food. On the upper story of this building ample space is provided for the various articles to be stored.

*Kitchen and offices.*—Immediately to the south of the store building, and separated from it by a small courtyard, are the kitchen offices and dining-room block, comprising kitchen, general scullery, vegetable scullery and store, larder, meat, poultry, fish, vegetable, and milk stores. Entering off the kitchen are the serveries, for the distribution of food to the several pavilions, and to the nurses' and servants' dining-rooms, in proximity to which are pantries for washing up and storing the dinner dishes ; also a cook's room and stores.

*Dining-rooms.*—The nurses' dining-room is provided with a glazed screen, dividing it in two, with separate entrances to permit of the separation of scarlet fever nurses from the others. That for the servants adjoins the kitchen, and has also a separate entrance.

Southward from the kitchen block is the servants' home, consisting of four large dormitories—two on the ground floor and two on that above—each divided into cubicles ; with an intermediate building, comprising rooms for head servants—two on each story—a day-room on the lower story and a sick-room on the upper, and over these a large attic for recreation and general use. Ample bath, lavatory, and water-closet accommodation are provided on each flat.

*Nurses' home.*—To the south of the servants' home is that of the nurses—a building of four stories—in which are provided suitable apartments for the matron, separate rooms for 150 nurses ; four day-rooms and library for the use of the nurses ; three sick-rooms, with small kitchen attached ; a large recreation room for the general use of the staff ; bath and lavatory accommodation and linen stores on each floor ; luggage lift and staircase for each wing. The arrangement of the rooms on the several floors of the nurses' home, and the corridors leading to them being to a large extent identical on the several flats, the dividing walls with the corridor floors and staircases can be constructed of fireproof material, and the risk of danger from fire thereby greatly diminished, while the means of escape in

the event of its occurring are largely secured. Except in the day-rooms, sick-rooms, and matron's quarters, it is intended to heat with steam radiators, and dispense with fireplaces both in the nurses' and servants' homes, thus further reducing the risk of danger from fire.

*Sunshine and recreation.*—The nurses' and ward assistants' homes have been so planned that nearly every room shall, more or less, partake of the beneficial effects of sunshine, while a fair share of space for out-door recreation is provided distinct from that for the patients.

*Ambulance drives and covered passages.*—For access to the various parts of the premises, ambulance drives are provided from the principal entrance, so that patients on arrival can either be taken for examination to the reception rooms before mentioned, or driven direct to the pavilion they are to occupy; and a separate road leads from a point near the main entrance to the stores, kitchen offices, and staff quarters, which can be reached with a minimum risk of infection by any from without who have occasion to visit these departments.

For convenience and protection in passing from one part of the premises to another, covered ways are provided between the general offices, central premises, pavilions, and staff quarters. These, though protected by roofs, will be to a great extent open on the sides, so that the risk of conveying infection from one part to another will be minimised.

*Subways.*—Beneath certain of the covered ways, and in convenient lines at other parts, subways will be provided for the conveyance of water, gas, steam, and electric connections.

*Wash-house and laundry buildings, boilers, &c.*—The wash-house and laundry buildings, with arrangement for staff washings, etc., distinct from those of the patients, and the disinfecter, boilers, and incinerators, are placed towards the south-east quarter of the establishment, sufficient steam power being provided for machinery and fittings of the most approved description for wash-house, laundry, disinfecter, culinary purposes, and general heating of the entire premises.

*Ambulance station.*—At the north-eastern quarter of the grounds are placed an ambulance station and stableyard, in which also accommodation for the men-servants and workshop premises will be provided.

*Educational, museum, and mortuary buildings.*—Adjoining

the ambulance station the plan shows a building for educational purposes, and near it pathological laboratory and museum buildings ; and in convenient relation to these, mortuary buildings, consisting of dead-house, *post-mortem* room, and chapel, with suitable arrangements for the funerals leaving the premises as unobtrusively as possible.

*Lighting.*—For artificial light it is intended that electric lighting should be adopted throughout the establishment.

*Gas for cooking.*—For certain culinary purposes it will be convenient to use gas, both in the general kitchen, etc., and in the sculleries attached to the several pavilion wards.

*Coal stores.*—A coal store will be provided at the boilers near the south-eastern quarter of the premises, and another under the kitchen, and smaller stores in each of the pavilions and other buildings where coals are required.

*Fire appliances.*—*Water tower.*—Hydrants and hose for use in case of fire will be provided in convenient situations throughout the premises ; and for additional supply and pressure for this purpose, as well as to meet the possible contingency of the main water supply being at times turned off, as for repairs, it is proposed to erect on the higher ground a water tower, with tank of sufficient size to secure good supply on such occasions.

Sir Henry D. Littlejohn, in answering questions, explained that each ward stood by itself, and that each nurse would have to disinfect before being allowed to mix with her fellows, cross-infection being thus prevented. It was also proposed to have specially qualified nurses who could give an hour's tuition each day to children able to receive it, the children's "thirst for knowledge" being thus maintained. He also said that the plans, when fully completed, would be exhibited to the medical profession, and that no final steps would be taken until these had received their approval.

On the motion of the Chairman, seconded by Dr Joseph Bell, it was agreed "That the Society approve of the site selected, and, generally, of the plans" ; and also, on the motion of the Chairman, seconded by Professor John Struthers, "That the number of beds to be provided, namely, 600, is not more than the wants of Edinburgh demand." It was also agreed on



# Diphtheria.

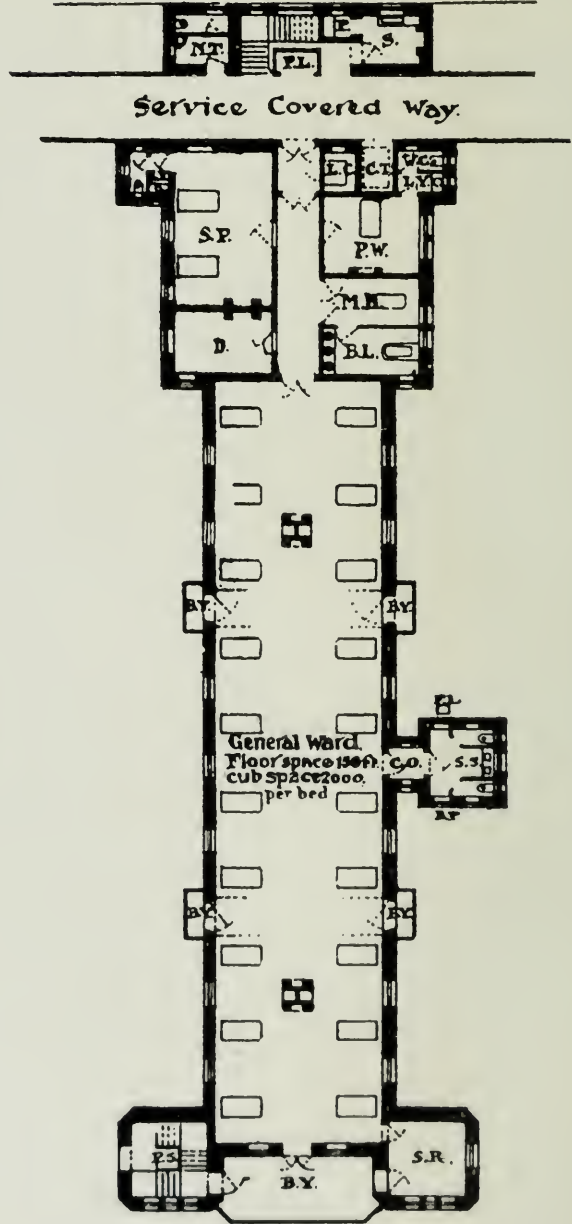
14.

# Scarlet Fever.

2 . 3 . 4 . 5 . 6 . 7.

Ambulance Drive

Ambulance Drive









the motion of Professor John Chiene, seconded by Dr Allan Jamieson, that copies of these resolutions be sent to the Town Council. Bailie Pollard and Mr Morham were thanked by the Society.

## Meeting IX.—May 5, 1897

Dr WILLIAM CRAIG, *Vice-President, in the Chair*

### I. ELECTION OF MEMBER

George K. Grimmer, M.B., C.M., South Queensferry, was elected an Ordinary Member of the Society.

### II. EXHIBITION OF PATIENTS

1. *Mr Alexis Thomson* exhibited—

(a) A patient on whom he had operated for STRICTURE OF THE SMALL INTESTINE following upon strangulated inguinal hernia.

(b) An adult male patient the subject of LUMBAR HERNIA resulting from weakening of the posterior abdominal wall by abscesses connected with sacro-iliac disease.

### III. EXHIBITION OF SPECIMENS

1. *Mr C. W. Cathcart* exhibited SPECIMENS OF CATGUT ROLLED IN BALLS similar to those of twine, and demonstrated the method of rolling them. He said that the use of these balls had many advantages. During an operation if the thread of catgut were drawn through a temporary plug of carbolised wool packed into the neck of the catgut bottle, the thread could be drawn out as required, the contents of the bottle were protected from dust, and the surgeon's fingers were safe from contamination as he helped himself to catgut. The balls take up less room than any form of spools, and give off their catgut without the need of an axis to rotate on. When one ball is finished another is dropped into the bottle from a stock bottle, and is at once ready for use. Thus the use of these balls saved apparatus, trouble and space.

Messrs J. F. Macfarlan & Co. were making experiments in preparing catgut and rolling it in balls, and Mr Cathcart hoped

that they would soon be able to supply a thoroughly reliable catgut in this form. Silk could be rolled by hand into balls quite as easily as catgut, and could be used in the same way.

2. *Dr Matheson Cullen* exhibited a SPECIMEN OF DUODENAL ULCER from a patient who had exhibited no symptoms of the condition till its perforation. It was the case of a young man, æt. 22 years, with an excellent family and personal history. He began work as a coal miner at the age of twelve and continued at it till he was twenty. Thereafter he acted as canvasser and collector for a charitable society. Once only had he consulted a doctor. This was when he was eighteen, and he was told he had indigestion, but he soon felt better, and did not take the medicine prescribed. With this exception he had never been ill, and save for a tendency to constipation enjoyed the best of health. One day he went out as usual after his midday meal, and was engaged in his daily business when he was suddenly seized with abdominal pain, and as it did not improve he was removed home in a cab. The pain began about 5 P.M., and he was seen an hour and a half later. Then he was lying curled up on his left side, constantly moaning and complaining of the pain. He vomited several times a considerable quantity of yellowish flocculent fluid. After an injection of  $\frac{1}{2}$  gr. morphia he became much easier, and permitted an examination to be made. The abdomen was not distended, but the muscles were somewhat taut, and the tenderness which was present seemed specially localised in the iliac fossa. The note was tympanitic all over, and no swelling could be detected in the region of the appendix. The temperature was 99°, the pulse 100, regular and full, but somewhat weak. The bowels had moved naturally in the morning, and as he seemed a good deal better, and could lie on his back and stretch his legs without much pain, it was decided to await further symptoms. He was next seen at noon the following day. He complained greatly of the pain, but was quite conscious, and had no idea of his dangerous condition. As a matter of fact he was *in articulo mortis*, his face pinched and drawn, the extremities cold and pulseless, and the whole body bathed in a cold, clammy sweat. He died a few minutes after. At 2 P.M. the following day a *post-mortem* was held. Only the abdominal organs were examined. The abdomen was greatly distended

and the skin over it green. On opening the peritoneum there was a sudden gush of  $H_2S$ , and the condition was found to be that of acute peritonitis. About 4 or 5 pints of yellowish brown flocculent fluid were present in the peritoneal cavity and about  $\frac{1}{2}$  pint of similar fluid in the stomach. The intestines were very carefully searched but nothing abnormal found till the duodenum was reached. Here on the anterior surface of the gut about 10 mm. from the pylorus was found a roundish perforation about 7 mm. in diameter. The ulcer, which was single, had the typical appearance, and there was no indication of any cicatrices of former ulcers in the stomach or duodenum.

3. *Dr John Thomson* exhibited three specimens of CONGENITAL HYPERTROPHY OF THE PYLORUS AND STOMACH-WALL, along with microscopic sections and photographs.

4. *Dr W. G. Sym* exhibited an EYEBALL AFFECTED WITH MELANOTIC SARCOMA, which he had removed from a woman, aged 66.

The case was in the third stage, that is, the tumour starting in the choroid coat had made its way through the coats of the eye and was growing among the fat and muscular tissue of the orbit, but was not adherent to bone. The new growth was much larger than ophthalmic surgeons usually see, as such tumours are more usually diagnosed and treated at an earlier stage. It had been necessary to clear out almost the whole contents of the orbit, in order to remove the whole tumour; the hæmorrhage was very serious. The patient's liver was found to be much enlarged, and there was reason to fear that secondary deposits were beginning to form there.

5. *Dr Theodore Shennan* exhibited the BACILLUS OF BUBONIC PLAGUE.

(1) Culture on agar, showing whitish or whitish-grey translucent colonies which coalesce to form a thickish and sticky film over the surface.

(2) Stained films of subcultures, showing the irregularity of form after three or four generations.

(3) Liver of guinea pig, showing the characteristic bacillus. This shows best when stained with weak fuchsin solution. The bacillus is seen in the capillaries. It is a slight, short bacillus with rounded ends, showing marked polar staining, the central part of the rod hardly staining at all.

## IV.—ORIGINAL COMMUNICATIONS

## 1. A CASE OF RENAL TUMOUR

By F. M. CAIRD, F.R.C.S. Ed., Assistant Surgeon, Royal Infirmary ;  
Lecturer on Surgery, Royal Colleges School of Medicine, Edinburgh

MR H., æt. fifty-six, came under my care early in March 1897, complaining of passing blood, general weakness, and loss of weight.

He states that since October 1895, he has seen blood in the urine with increasing frequency. The hæmorrhage is now practically continuous, and after any exertion, clots are passed. There is no increased frequency of micturition during the day, and at night he only rises two or three times. Pain of a dull heavy character is referred usually to the left lumbar region, but more recently he feels it in the right. He complains of a general heaviness about the lower part of the abdomen, but has no special acute suffering.

The patient had been seen by me formerly, in the early stage of his complaint, when I inclined to there being a vesical tumour. There was no thorough examination, which he declined, and he refused operative measures. His own attendant all along considered that the left kidney was at fault.

The appearance he now presented was very different from that of two years ago. He had aged considerably, and was much greyer. He was markedly anæmic, the lower eyelids were somewhat puffy, and he was rather short-winded on going upstairs. There was marked resistance, fulness and tenderness over the left kidney, but no great filling up of the loin ; tenderness was most pronounced just below the last left rib. Palpation did not yield much information, as the patient was a short thickset muscular man, whose abdominal walls refused to relax. Urine, deficient in amount, 28 to 40 ozs. acid, sp. gr. 1012 to 1024, urea 4·25 gr. per oz. It abounded in blood and long filamentous clots as if from the ureter, together with great leech-like masses. Under the microscope, in addition to corpuscles, there were large ovoid and rounded cells, showing fatty degeneration.

The diagnosis was villous carcinoma of the kidney with,

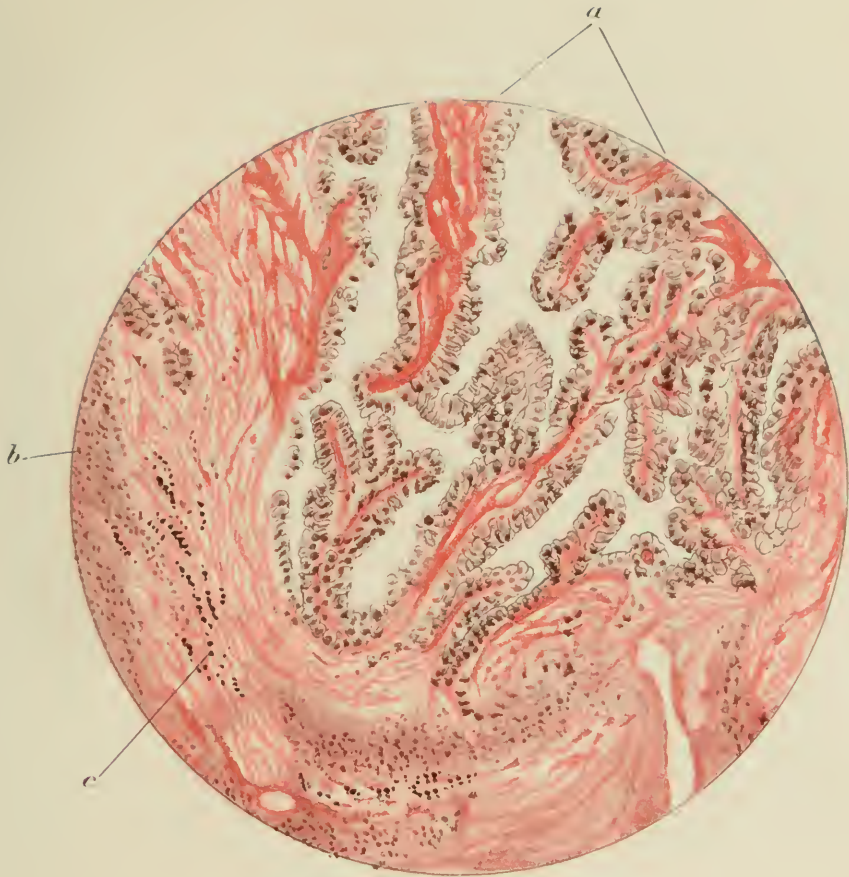


PLATE I.

TO ILLUSTRATE MR CAIRD'S CASE OF RENAL TUMOUR.

*Haematoxylin, Rubin & Orange. Zeiss A. Obj. Oc. 2.*

- A. Trabeculae with Cylindrical Epithelium.*
- B. Small celled infiltration.*
- C. Pigment*





perhaps, a stone. Exploration and removal of the organ was advised.

The patient was ready to consent to any treatment however hazardous, as he realised that his life could not be prolonged under the existing circumstances. He was accordingly prepared for operation by lying in bed for a few days, with milk diet, and ordered to drink quantities of aerated distilled water. His urine now rapidly improved in quantity and character.

On March 20th chloroform was administered and the bladder found to be healthy on cystoscopic examination. A cloud of granular detritus was seen to issue from the mouth of the left ureter. The muscles being now relaxed, a huge, firm swelling was found to occupy the site of the left kidney. It was impossible to define its extent, since the ribs of the large capacious thorax covered everything in front, while behind there was barely a finger's breadth between the last rib and the iliac crest. An incision was accordingly made from the angle between this rib and the erector spinæ, and ran forwards parallel with the rib. On introducing the hand it was possible to define a tumour about the size of the human head. The connective tissue stripped with ease posteriorly, but in front and below the diaphragm, because of adhesions and the great depth of the wound, it was impossible to free the growth.

The incision was accordingly prolonged forward, the ribs pulled up and an attempt made to form a pedicle by stripping off the capsule. This proved futile, it was so firmly adherent and hæmorrhage became so copious. During the violent attempts made to enucleate the mass, it ruptured at one part and the patient suffered from such pronounced shock that his pulse was imperceptible and we were tempted to abandon our efforts. An unsuccessful attempt was made to define a pedicle, and again we thought of passing a ligature to strangulate part of the growth, but the adhesions towards the diaphragm and the inaccessibility of that portion were deterrents. I then thought of evisceration, and so laid open the posterior border and scooped out the soft pulpy contents with the right hand, while the left compressed the region of the entrant vessels. It was now found possible to detach and dislodge the upper end of the kidney, a pedicle could be formed, large clamp

forceps were applied to it and the pedicle was divided. The patient was now apparently moribund, and we had no thought of doing more than getting him back into bed alive, but on freely douching out the detritus and blood from the wound with warm, sterile, salt solution, his pulse once more could be felt. The pedicle was accordingly secured with silk, and a fresh douching enabled us to ligature the remaining vessels and close the wound throughout the greater part of its length with deep and superficial sutures. The wound was dressed and the patient put to bed, with the feet of the bed raised six inches. The patient gradually rallied. Towards evening his speech was confused and the pulse was still running. There was hardly any urine, and we feared suppression till the second day when he passed 10 oz. The future history was uneventful. There was at first a copious serous discharge. The patient rapidly improved in colour, strength and weight, and was on the couch twenty-one days after operation. The cicatrix measured 11 inches.

The lumbar incision was employed because of the free access it affords, and because the anterior incision in the linea semilunaris had proved disappointing in that respect on former occasions and in the practice of some of my colleagues. Moreover, by an extra-peritoneal operation one is not incommoded by the presence of the intestines.

The patient at present is doing well.

The tumour weighed  $3\frac{1}{2}$  lbs. It presented in greater part the characters of a papillary adenoma. The capsule was thickened, adherent, very vascular and abounded in granular pigment and small celled infiltration. The softened portions consisted of amorphous necrotic tissue.

See Plates 1 and 2.

## 2. ON CONGENITAL GASTRIC SPASM

*(Congenital Hypertrophy and Stenosis of the Pylorus)*

By JOHN THOMSON, M.D., F.R.C.P. Edin., Extra-Physician to the Royal Hospital for Sick Children, Edinburgh

CONGENITAL hypertrophy of the pylorus is a condition to which until quite recently almost no attention had been directed; but within the last few years quite a number of papers on the sub-

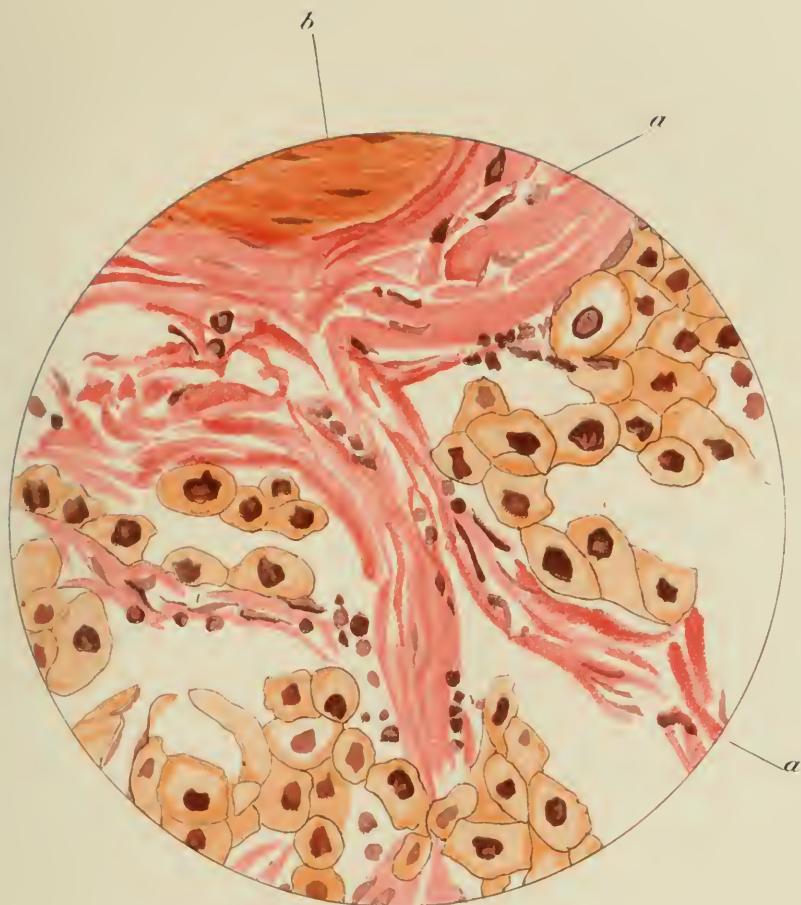


PLATE II.

TO ILLUSTRATE MR CAIRD'S CASE OF RENAL TUMOUR. PLATE I.

*Haematoxylin, Rubin & Orange. Hart 5. Obj. Oc. 2.*

A. *Trabeculae with Epithelium.*

B. *Unstriated Muscular Fibre.*



ject have appeared. Instances of hypertrophy and stenosis of the pylorus coming on in adult life have indeed been frequently recorded, but these cases are manifestly of a somewhat different pathology. This must also be true of the cases which have been described by Landerer,<sup>1</sup> Maier,<sup>2</sup> Tilger,<sup>3</sup> and others as instances of congenital stenosis of the pylorus, although they were only found in adults and older children.

The earliest recorded cases of the certainly congenital variety of pyloric obstruction which I have been able to find are those published by Williamson<sup>4</sup> of Leith in 1841 and by Dawosky<sup>5</sup> in 1842. In both of these the condition found *post-mortem* was described by the author as "hypertrophy of the submucous connective tissue," but the description of the specimen as well as the clinical history given make it quite clear that it was the muscular layer really which was affected.

The next cases were published very much later by Hirschsprung<sup>6</sup> (two cases), Peden,<sup>7</sup> and Newton Pitt.<sup>8</sup> Last July I put on record two cases in the Edinburgh Hospital Reports,<sup>9</sup> and since that time interesting communications on the subject have appeared by Finkelstein,<sup>10</sup> Gran<sup>11</sup> (three cases), Schwyzer,<sup>12</sup> De Bruyn Kops,<sup>13</sup> and Soltau Fenwick.<sup>14</sup> I have also myself met with a third well-marked case which is recorded below. There are now at least fifteen cases more or less fully described of this morbid condition being found in children who have died with characteristic symptoms, so that we have some material wherefrom to frame a clinical description of the disease.

The publication within such a short space of time of so many cases of this hitherto almost unknown abnormality removes it from the category of mere pathological curiosities, and imparts to it the interest which always attaches to a disease which we are expecting to meet with again. Therefore, although there are still many points on which further light is wanted, it may not be quite premature to go briefly over the main clinical and anatomical facts of the published cases and to see what suggestions as to etiology and pathology can be gathered from them.

The facts of my third case are as follows:—

#### *Case.*

On April 13th, 1896, I saw with my friend Dr T. B. Darling a female infant aged twenty-seven days, who was suffering from constant vomiting.

She was somewhat emaciated, but seemed in every respect a well-developed child, and her heart and lungs were normal. On careful palpation a small, hard, very movable tumour could sometimes be felt in the epigastric region. This was, however, very indistinct, and no weight would have been attached to it had it not been that the symptoms present, taken along with the condition of the pylorus found in my two former cases, suggested its possible importance. The rest of the abdomen was normal, and not at all distended.

The parents were strong healthy people. They had been married for more than twelve years before pregnancy occurred. This was attributed to the presence of a gynecological abnormality which, at the end of that time, had been removed by operation. One miscarriage had occurred before this child was born.

During the early weeks of her pregnancy, the mother was travelling a great deal by sea, and was severely sick.

At birth the infant weighed 7 lbs. 2 oz., and seemed perfectly normal. There was very little breast-milk, and what there was did not satisfy her. She would remain at the breast for even forty or fifty minutes at a time without getting enough. She soon became exceedingly restless, and cried a great deal as if in severe pain. Her motions were very small, green and slimy. After persevering for a week or so her mother gave up the attempt to nurse her, and a mixture of cow's milk and water was given from a bottle. So far there had been scarcely any vomiting. At first the bottle seemed to satisfy the child much better than the breast had done; but vomiting began almost at once and rapidly became severe. It occurred very frequently, and the milk was expelled with great violence through the mouth and nose. Vomiting always occurred at once if she took more than two ounces at a time. Peptonised milk was tried for a while, but with no greater success.

*Progress.*—About the 13th April a wet-nurse was procured and her milk was drawn off and administered to the baby through a Auvard's breast-pump. This proved, however, very little better than the other ways of feeding: the child returned about half of the milk she swallowed. Often, after taking a drink, she would immediately vomit it, but if put to the breast-pump again at once she would retain the second supply.

Stomach-washing with plain warm water was tried, but this had not the slightest effect in stopping the vomiting. Bismuth was also given in fairly large doses with no result. A number of other fluids besides milk were then most carefully tried, and it was found that the stomach acted in the same way to all, whether it was breast-milk, diluted cow's milk, plain or peptonised, cream and whey, or chicken tea, etc. There was no ascertainable difference in the rapidity and certainty with which they were returned.

On April 17th, we commenced feeding the child by gavage. A soft rubber catheter was introduced into the stomach by the mouth every two hours, and 2 oz. of dilute peptonised milk was poured down it through a filter. At first this succeeded surprisingly in checking the vomiting—feed after feed being retained for the first two days, and only occasional meals being vomited. It was found, however, when the tube was introduced at the end of the two hours' interval, that instead of being empty as it should have been, the stomach usually contained nearly two full ounces of sour, slightly turbid fluid with a few small, soft curds in it. It was thus evident that although the stomach had still the power to partially digest its milk, there was extremely little absorption of its contents going on, and nothing was passing out of it through the pylorus. At this time there was very little urine passed. It was found that the infant seemed more comfortable after the peptonised milk than after the same quantity of breast-milk.

On the 19th, there seemed to be much more fluid absorbed, as only from  $\frac{1}{8}$  to  $\frac{1}{4}$  of the quantity that was put in could be drawn off after two hours. The urine also passed much more freely, and within three or four days the child was found to have gained two ounces in weight.

On the 20th, she retained all the meals given through the stomach-tube, but one which she was allowed to suck from a bottle was returned at once. During the next few days, however, she began to vomit the food even when introduced with all care through the tube. This continued, and although a number of other foods were tried, there was no improvement. The child steadily emaciated and lost strength. Convulsions began on April 28th, and she died quietly on the morning of May 3rd.

The *post-mortem examination* took place on May 4th at 4 P.M., and was restricted to the examination of the stomach and neighbouring parts. The intestine contained a considerable amount of gas and a small quantity of liquid yellow fæces. The œsophagus seemed normal, not being dilated as in my two former cases.

The stomach was large, measuring about  $4\frac{1}{4}$  in. in length from the duodenal end of the pylorus to the cardiac extremity, and  $2\frac{1}{4}$  in. across at the larger end. It contained a considerable amount of liquid food which had been given shortly before death, and a great deal of very tough mucus. None of the fluid could be squeezed through the pylorus by compressing the stomach. The pylorus, before it was opened into, felt like an almost solid cylinder, although it was not quite so hard as in my two former cases. It measured about  $\frac{7}{8}$  in. in length,  $\frac{5}{8}$  in. in diameter, and  $1\frac{7}{8}$  in. in circumference. On opening the stomach the wall was found to be greatly thickened towards the pylorus, but thin at the cardiac end. The thicken-

ing was due mainly to increase in the muscular coat. The gastric mucous membrane seemed normal, and there was no trace of any ulceration past or present to be found on it.

Microscopical sections of the pylorus and adjacent stomach-wall were made for me at the Laboratory of the Royal College of Physicians. The condition present resembled, in most respects, that described and figured in my former paper as found in the other cases. The epithelial layer of the mucous membrane was normal, and the great bulk of the thickening of the part was due to enormous increase in the inner circular layer of the muscular coat, while the increase in the outer longitudinal layer was comparatively slight. The whole muscular layer measured  $\frac{3}{16}$  in. in diameter. As in the other cases there seemed no increase in the intra-muscular connective tissue. There was, however, one striking difference in this case, namely, that here the submucous connective tissue was greatly increased in amount. Where this was least marked, it was fully  $2\frac{1}{2}$  times, while in some places it was as much as 4 times the normal thickness. In the part of the stomach-wall adjacent to the pylorus, of which a section was made, this increase of submucous connective tissue was even greater than in the pylorus. The serous coat was normal.

#### CLINICAL FEATURES.

1. *Sex, Family History, &c.*—Seven of the patients were girls, six were boys, and in two cases the sex is not mentioned. There is nothing special noted in connection with the health of the parents, or with that of the other children in the families. In several of the cases the mother suffered severely from ill-health during her pregnancy, but in none was anything abnormal noted in connection with the labour.

2. *Condition at Birth.*—In all cases the children were born at full-time, and were well-grown and well-nourished at birth. This shows clearly that the condition, although a congenital one, does not interfere with the nutrition of the fœtus.

3. *Commencement of Symptoms.*—There is usually, at first, a period of apparently perfect health, and no sign of ill-health appears until the vomiting sets in. This is said to have begun immediately after birth in two of the cases, and on the third day in one of them. In the seven other cases, however, in which this point is mentioned, the child remained apparently quite well for from one to five weeks.

4. *Symptoms.*—The vomiting, in uncomplicated cases, is somewhat peculiar in several respects. At first, it occurs at



more or less long intervals, but these rapidly diminish, and it soon follows nearly every attempt to swallow fluid. At the beginning, large quantities of liquids always set it up; later on, smaller quantities do so; finally, the smallest spoonful is vomited at once.

The tongue is clean and the breath free from sourness. The vomited matters consist simply of the fluids swallowed mixed with mucus; they are never bile-stained. When the vomiting is thoroughly established it is very violent in character, the liquid being ejected with great force, and the child being sometimes apparently severely pained. The rapidity and certainty with which a given feed is rejected seems to depend almost entirely on its amount, and to be scarcely if at all influenced by the nature of the fluid given.

The ordinary means of allaying vomiting have generally no result at all. Bismuth and other local sedatives do not succeed in quieting it, and stomach-washing generally fails to check it even temporarily. In my third case, the vomiting was certainly lessened very markedly for a time when gavage was employed and the child was not allowed to suck. The periodical passage of the stomach-tube also reveals the interesting fact that when the fluid is not vomited it is often retained for long periods in the stomach unabsorbed, the proportion retained varying considerably at different times. This would seem to indicate not only that the pylorus is impassable at these times, probably owing to spasmodic muscular action, but that there is something interfering with the absorption of fluids by the stomach.

The motions are often noticeably scanty, but usually otherwise normal. They are sometimes constipated, and towards the end they often contain much mucus.

5. *Physical Signs.*—The intestines are collapsed and the abdomen lax, so that it can be readily palpated. Finkelstein made out clearly by palpation the hard hypertrophied pylorus as an easily movable tumour lying in the epigastric region, somewhat to the right of the mesial line, and also proved its anatomical connections by the passage of a catheter and by the injection of air into the stomach. The peristaltic movements of the stomach were also very distinct in his case.

6. *The Duration of Life* varies from three weeks to a little over six months—the average being less than twelve weeks.

It is well worthy of note that the degree of muscular hypertrophy of the pylorus bears no constant relation to the length of the child's life. In fact, in some of the cases where the hypertrophy was greatest the duration of life was particularly short. This fact seems strongly in favour of the hypertrophy having developed *in utero*, as from other considerations it must obviously have done.

Finkelstein relates three remarkable cases out of Professor Heubner's private practice, which, in many respects, resembled those under discussion, and yet recovered. In none of the fatal cases was even palliative treatment more than very temporarily successful.

7. *Treatment*.—While the nature of the disease precludes all thought of successful medical treatment, the question of its relief by surgical operation is worthy of consideration, as Schwyzer points out. He suggests laparotomy, and either dilatation of the pylorus or gastro-enterostomy. It does not seem as if the former could possibly do any good in the presence of so much muscular tissue, but the latter, or the excision of the hypertrophied pylorus, might be worth trying.

#### MORBID ANATOMY.

1. *General Condition*.—There is always more or less emaciation due to the extent to which the incessant vomiting has interfered with nutrition. In one of Hirschsprung's cases there were tubercular complications present in the chest, but usually no abnormality unconnected with the stomach disorder is to be found in the body. The alimentary canal below the pylorus is perfectly normal. The œsophagus is sometimes noticeably dilated, sometimes of normal calibre. In none of the cases was any other congenital abnormality noted.

2. *Condition of the Stomach*.—The stomach is generally considerably enlarged; and while its walls at the cardiac end are as thin as, or thinner than usual, over the rest of the organ they are much thicker than normal, especially towards the pylorus. The pylorus itself is much enlarged, and looks and feels like an almost solid fusiform, or even oval mass of muscular tissue. When looked at from the duodenum the pyloric opening seems almost closed, the mucous membrane being puckered by the contraction of the hypertrophied muscular wall; and, although it readily allows the passage of

a probe, even firm pressure on the stomach is not sufficient to drive fluids through it into the bowel. In none of my cases, certainly, was there any fibrous stricture present at all. The whole narrowing of the passage seemed to be due to compression by the hypertrophied muscle. The mucous membrane seemed indeed rather smaller in extent than in a normal pylorus, but the constant compression to which it had been subjected would easily account for this. In each case it was voluminous compared to the size of the lumen which it lined.

In all the cases which were examined microscopically (except Finkelstein's), the thickening of the pylorus was due mainly to great hypertrophy of the circular layer of muscular fibres. Finkelstein's case formed a remarkable exception to what seems to be the rule in this matter, as in it hypertrophy of the longitudinal muscular layer constituted the main cause of the thickening. The serous coat is unchanged. The submucous coat is sometimes greatly thickened, sometimes slightly so, and sometimes it is normal. The mucous membrane is either quite normal, or it shows merely such changes as would be expected to follow the constant violent vomiting and the attempts to feed the child in a variety of ways.

#### PATHOLOGY AND ETIOLOGY.

With regard to the pathology and etiology, the following suggestions may be made:—

(1) The dilatation of the stomach and œsophagus, and the slight signs of irritation in the mucous membrane (when such are present) are, of course, merely the result of the muscular overaction of the stomach.

(2) The muscular hypertrophy of the pylorus and stomach-wall is also merely a secondary occurrence, being obviously due to abnormally increased functional activity, and this (from the degree of the hypertrophy, and the early age of the children) must have existed for a considerable period of intra-uterine life.

(3) The essential lesion, therefore, is not a muscular but a nervous one—a functional disorder of the nerves of the stomach and pylorus leading to ill co-ordinated and therefore antagonistic action of their muscular arrangements.

(4) Such an antagonistic spasm of the pylorus and stomach must be connected with the passage downwards of the large

quantity of liquor amnii which the fœtus is believed to swallow during the later months of intra-uterine life. It might be very slight in degree, and yet, owing to its constant recurrence, and the power of growth of the fœtal tissues, it might lead in time to very great hypertrophy.

(5) The functional irregularity might conceivably be caused by an irritating property in the fluid entering the stomach. This, however, is rendered unlikely, as I pointed out in my former paper, by the fact that there are no signs of severe irritation found in the mucous membrane of the stomach, or elsewhere, in the alimentary canal. The further fact, that after birth the vomiting is so largely influenced by the quantity, and so little by the quality of the ingested fluid is also, I think, against this view.

(6) It seems more in accordance with the facts and probabilities of the case to suppose that the essential fault, which gives rise to the muscular hypertrophy *in utero*, as well as to the vomiting after birth, lies not in the stomach's contents, but in its nervous mechanism, and is probably due, in some way, to delayed or imperfect development.<sup>1</sup>

(7) Lastly, if it is admitted, as I think it must be, by everyone, that the muscular hypertrophy is secondary to some sort of overaction, it will surely be better to call the disease "Congenital Gastric Spasm," or "Congenital Pyloric Spasm," or even "Congenital Idiopathic Vomiting," rather than to apply to it any term which is merely descriptive of the secondary anatomical changes found after death.

#### LITERATURE.

<sup>1</sup> Landerer, "Ueber angeborene Stenose des Pylorus," Diss., Tübingen, 1879. <sup>2</sup> Rud. Maier, "Beiträge zur angeborenen Pylorusstenose," Virchow's Archiv, Bd. cii., 1885, S. 413. <sup>3</sup> Tilger, "Ueber die stenosirende Pylorus-hypertrophie," Virchow's Archiv, Bd. cxxxii., 1893, S. 290. <sup>4</sup> Thomas Williamson, "Case of Scirrhus of the Stomach, probably Congenital," *Lond. and Edin. Monthly Jour. of Med. Sci.*, Jan. 1841, p. 23. <sup>5</sup> S. Dawosky, "Observation d'hypertrophie du tissu cellulaire sous-muqueux du pylore chez un enfant de dix semaines," Caspar's *Wochenschrift*, 1842, No. 7, and *Arch. gén. de méd.*, 1843, 4 série, T. ii. p. 93. <sup>6</sup> Hirschsprung, "Fälle von angeborener Pylorusstenose," *Jahrb. f. Kinderheilk.*, 1888, Bd. xxviii., S. 61. <sup>7</sup> W. K. Peden, "Congenital Stenosis of Pylorus," *Glasgow Med. Jour.*,

<sup>1</sup> A close parallel to this may possibly be found in those cases of congenital hydronephrosis, with greatly hypertrophied bladder, where no organic obstruction exists to the passage of urine.

June 1889, p. 416. <sup>8</sup> G. Newton Pitt, "Hypertrophy of the Pylorus," *Trans. Path. Soc., Lond.*, 1892, p. 63. <sup>9</sup> John Thomson, "Congenital Hypertrophy of the Pylorus and Stomach-wall," *Edin. Hosp. Rep.*, 1896, vol. iv. p. 116. <sup>10</sup> Finkelstein, "Angeborene Pylorusstenose," *Jahrb. f. Kinderheilk.*, 1896, Bd. xliii., S. 105, and discussion on this paper, *Berlin. klin. Wochenschr.*, Jan. 11th, 1897. <sup>11</sup> Chr. Gran, "Bemerkungen über die Magenfunctionen und die anatomischen Veränderungen bei angeborener Pylorusstenose," *Jahrb. f. Kinderheilk.*, 1896, Bd. xliii., S. 118. <sup>12</sup> F. Schwyzer, "Congenital Hypertrophy and Stenosis of the Pylorus," *New York Med. Jour.*, Nov. 21st, 1896. <sup>13</sup> De Bruyn Kops, "Congenital Tumour of the Pylorus," *Nederlandsch Tijdschrift voor Geneeskunde*, No. 25, Dec. 19th, 1896 (*Brit. Med. Jour.*, Epitome, Jan. 30th, 1897). <sup>14</sup> W. Soltau Fenwick, "The Disorders of Digestion in Infancy and Childhood," London, 1897, p. 315.

### 3. A CASE IN WHICH A FRAGMENT OF STEEL WAS REMOVED FROM THE VITREOUS HUMOUR

By WILLIAM GEORGE SYM, M.D., F.R.C.S. Ed., Ophthalmic Surgeon, Leith Hospital ; Lecturer on Diseases of the Eye, Edinburgh

THE following case presents several points of interest, in respect principally of the successful removal of a spark of metal after so long a period as thirteen months from the date of the injury. The question as to the wisest mode of treatment too, is one of much importance ; it is upon that that I shall chiefly dwell.

R. B., a marine engineer, consulted me as to his left eye, which had been injured thirteen months previously. He had been engaged in drilling a plate of metal, when the point broke off the steel drill, and a particle struck him in the left eye.

On admission to Leith Hospital, the eyes were found to present the following appearances. The right eye was normal in every respect, free from all sign or symptom, in particular, of sympathetic ophthalmia. The left eye was slightly injected all over the visible sclerotic ; there was a ripe cataract ; a freely movable iris without any adhesions ; normal tension : vision amounted to bare hand movements. The field of vision was slightly restricted all round, perhaps slightly more so at the lower nasal portion. There was a small wound in the sclerotic, just to the inner side of the lower end of the vertical line of the eye, and immediately posterior to the ciliary area. This wound was firmly healed and not in the least dimpled. The most

striking point about the eye, however, was the curious staining. The iron in the eye had stained the sclerotic of a dull pink, and the iris of a dull rusty reddish brown, contrasting strangely with the bright blue of the healthy eye; even the aqueous humour seemed slightly affected, and the white cataract had a faint tinting. The globe was not in the least degree painful or tender to the touch.

He asked for advice, and it seemed to me that five methods of treatment were open to me for choice.

(1) I could leave matters alone. The eye was quite well, though of little use: any treatment short of what was somewhat bold or severe was liable to set up mischief: and since so long time had passed since the injury without sympathetic trouble occurring, he might escape altogether. The dangerous time is, as a general rule, past by the end of the third month from the date of the receipt of injury, and that was now more than a year ago.

But the patient's occupation necessitated his going long voyages, and his work was somewhat laborious; there was therefore danger that at any time owing to the shifting of the foreign body, or even perhaps without that, sympathetic mischief might arise and long before his arrival at a port where he could receive proper treatment both eyes might be irretrievably lost. A man with a foreign body in his eye is in constant danger all his life; he can never be counted safe from sympathetic mischief. That there was a foreign body present I could not doubt. For we had the presence of the wound below showing that the globe had been perforated, and the deep staining of the iris, etc., owing to the presence of a "Chalybeate spring" in the interior of the globe. The eye, again, with its cataract was unsightly, interfering, or apt to interfere, with his obtaining work.

Taking all these matters into consideration I felt that I should be doing wrong to advise that things should be allowed to remain *in statu quo*, even though active treatment might involve considerable danger.

(2) I might extract the cataract in the first place. There were two reasons for this. (a) It was possible that the foreign body might be lodged in the lens and come away with it. This supposition I rejected, because the lens was but slightly stained, because of the situation of the wound in the globe, and

because of the absence of iritis. Had the foreign body lain in the lens, cataract would have formed with rapidity, which would have involved swelling of the lens, and with almost absolute certainty some inflammation of iris with posterior synechiæ. Of these there were no signs whatever. A rapidly formed cataract would also in all probability be rapidly absorbed to a large extent, whereas in this case the whole of the lens was evidently present. I therefore decided that there was no likelihood of the foreign body being in the substance of the lens. (b) On removal of the opaque lens, I should, I hoped, be able to see the foreign body, and by carefully localising it I might at a subsequent operation remove it. But it was by no means certain that I should see the foreign body which I judged to be well back in the vitreous humour and in its upper outer district. I judged it to be there, first, on account of the greater degree of restriction of the field of vision in the region corresponding to this area (though I admit this was not very satisfactorily proved); and secondly, arguing from the position in which he was at the time of the accident and the site of the wound of entrance. An objection to extraction of the lens without further procedure on the spot was that any operative interference short of removal of the foreign body increased very greatly the risk of sympathetic mischief. Nothing could be more likely than that the wound would not heal properly, the eye would become soft and tender, the foreign body would come to lie against and irritate the ciliary body, and the second eye would take on ophthalmia migratoria. To my mind this was a fatal objection. I rejected the idea of simple extraction of the lens.

(3) I might extract the foreign body through a small incision and leave the cataract for subsequent attention. The difficulty, however, would be to find the particle, particularly as one could not guide the end of the magnet; and if one did manage to extract the steel, the sight and appearance of the patient would be no better than before. He would, however, be free from risk of sympathetic ophthalmia. It is not good practice in my opinion to make a very small incision when trying for a foreign body, and if I were going to make a large one I might as well make use of it for extraction of the lens. Another disadvantage of the procedure would be that the eye would not be left in so fit a state for operation for the removal

of cataract ; and if I should fail to find the foreign body I should have done the maximum of harm and the minimum of good. I decided against the procedure.

(4) I might simply enucleate the injured eye. This would cut the Gordian knot ; the patient would be freed from risk no doubt, but at the expense of everything. The surgeon whom the patient had consulted in London had advised that the eye ought certainly to be removed and that at once : the patient had declined to submit to this.

(5) On careful consideration of the whole case I decided that one ought to make an attempt to save the eye, and to obtain some sight by removal of the cataract, but that at all costs the foreign body must be removed. I therefore came to the conclusion that the proper course to pursue was to extract the lens, and *at the same sitting* to remove the foreign body, if possible. But I informed the patient that, at the best, good vision was not to be expected, and that, if I could *not* get the foreign body, and if the eye, as in that case was probable, became and remained irritable and dangerous, he ought to consider that every chance had been given to it, and that it should then be removed. To this he agreed, regarding the operation as an attempt to preserve the eye rather than to restore vision ; and I accordingly extracted the lens in the usual way, making a rather more free iridectomy than I usually do. I then introduced the electro magnet (Snell's pattern) at the same sitting and pushed it well back into the vitreous chamber, making especially for the part where I judged the foreign body to lie. The first attempt was a failure, but on the second introduction of the magnet I heard the soul-stirring click which indicated the attachment of the piece of steel, and I safely extracted it. This I was so fortunate as to accomplish without the loss of a particle of vitreous humour ; and the case was treated like any other case of simple extraction of the lens. The chief risk in this method of treatment was lest a quantity of vitreous humour should be lost. Had this taken place, the globe would probably have shrunk and become blind and highly dangerous to the safety of the other eye. The eye recovered well, without any severe reaction, and the patient left with fairly good vision ; as good as could be expected from the condition of the broken-up vitreous humour. He was told that it would clear more, and I have heard from him since that



vision has undergone further improvement. The relief to his mental distress is enormous, because he now feels fairly certain of freedom from sympathetic trouble which has been so long overhanging him. If I were asked I should say that his safety is not absolute, it is possible that this disaster may occur even yet, but it is very highly improbable; and certainly one hundredfold less to be feared than was the case while the eye contained a foreign body.

### Meeting X.—June 2, 1897

DR ARGYLL ROBERTSON, *President, in the Chair*

#### I. EXHIBITION OF PATIENTS

1. *Mr C. W. Cathcart* exhibited a young woman on whom he had successfully operated for RUPTURED GASTRIC ULCER on the 18th of November 1896. The diagnosis had been made by Dr A. D. Webster, who summoned Mr Cathcart at once, and the operation was performed seven hours after the rupture had taken place. The patient had complained for about two years of pain in the epigastrium, which sometimes laid her up for two or three days at a time on account of its severity. At other times she felt it less, but it annoyed her both after food and between meals. On the day of the seizure she had taken a good dinner at one o'clock, and at 3.30 she was suddenly attacked with very severe pain in the epigastrium, and screamed with agony for half an hour. The pain gradually subsided, and when Dr Webster saw her at 6.30 P.M. she was quiet, but in a very collapsed condition. Mr Cathcart saw her at 8.30, and after examination agreed with Dr Webster's view of the case, and with the help of Mr Shaw M'Laren began the operation at 10.30 P.M.

The general peritoneal cavity was normal, but some turbid fluid lay between the stomach and the liver; the anterior surface of the stomach was quite healthy, but, as the lesser omentum was œdematous, it was torn open, and the posterior surface of the stomach near the lesser curvature was examined from above. As the view thus obtained was insufficient, the greater omentum was torn through (after ligation of some blood-vessels near the greater curvature), and the posterior

surface of the stomach was explored from below. The ulcerated spot was, after some trouble, found to be adherent to the posterior abdominal wall. It seemed to be about one inch from the lesser curvature of the stomach, and about half-way between the pylorus and the œsophageal opening. A fold of the stomach wall was lifted up and laid over the ulcerated spot, and was tacked in position with fine silk stitches. The lesser sac of the peritoneum was then washed out with boiled water and a drainage tube led in through the opening in the great omentum.

The peritoneum was closed with ordinary catgut, and the edges of the rectus muscle and its sheath were united with chromic gut, and the skin with silkworm gut. The operation lasted about two hours.

At the first dressing next day, a considerable amount of brownish serum was found to have escaped through the tube, but this rapidly diminished, and the tube was removed on the fourth day. The patient was fed entirely on nutrient enemata for a week; after that rectal feeding was gradually diminished, and the quantity of milk given by the mouth was correspondingly increased. In five weeks she went home to the country and her health has since steadily improved. She now feels better than she has done for the last two years, as the epigastric pain has entirely left her. She has a good appetite and feels herself strong. The wound is soundly healed, and the abdominal wall is perfectly firm.

2. *Dr Darlington* exhibited for *Dr Norman Walker* a case of SCLERODERMA, showing both patches and bands. Duration, three months. Patches show the characteristic ivory white colour, but the hardness is very much less than when first seen.

On the back of the arm there is deeper affection, the subjacent tissue being affected.

The improvement since the patient was first seen, ten weeks ago, is remarkable; the skin is much softer and there is less contraction. She has had baths, massage and  $2\frac{1}{2}$  grains of thyroid twice daily.

3. *Dr Stewart Stirling* exhibited an UNCOMMON FORM OF PSORIASIS.

He said he was indebted to *Dr Malcolm Farquharson* for

this case of psoriasis. He saw it for the first time a few days ago, and, as it appeared to him to be a very unusual form of the disease,—especially on account of the peculiar distribution of the eruption,—he thought it worthy of bringing it before the notice of this Society.

The patient is a boy, aged 4 years. The disease first showed itself about five months ago in the form of a slight pustular inflammation about the roots of the eyelashes, from which the skin eruption gradually spread. Afterwards a number of patches appeared on other parts of the body, where it is unusual to find them.

At present the eruption consists of dry scaly patches, surrounding the eyes, affecting the eyelids, and extending on the right side to the cheek. The patch on the right side has somewhat the appearance of lupus. Patches of true psoriasis are also found over the pubis, on the inside of the thighs, symmetrically arranged, and as a distinct ring surrounding the root of the penis. A few others are found scattered on various parts of the body. One on the flexor surface of the arm, another under left arm, and another on the thorax.

It will be observed that the peculiarity of this case is that the eruption is almost entirely absent from the usual typical situations common in psoriasis, such as the elbows, knees, scalp and extensor surfaces.

## II. EXHIBITION OF SPECIMENS

### 1. *Mr Alexander Miles* exhibited—

(a) A SPECIMEN ILLUSTRATING SOME POINTS IN MIDDLE EAR DISEASE. It was from a girl, aged 12, who for fourteen months had suffered from chronic suppuration in the left middle ear, which passed to the mastoid process, and was accompanied by symptoms suggesting basal meningitis and possibly intracranial suppuration. The mastoid was explored and found to contain a large quantity of septic pus. A free communication was then established between the middle ear, the mastoid antrum, and the external auditory meatus, and in doing so the lateral sinus was exposed but not injured. For a few days after this operation the patient improved, but again relapsed, with evidence of irregular pressure on the left

motor areas. A trephine circle removed from over the temporo-sphenoidal lobe gave exit to a quantity of pus, and the opening was then enlarged in the direction of the roof of the tympanum, and more pus evacuated. Drainage was established, and for a few days the patient improved, but continued to exhibit signs of basal meningitis, of which she died ten days after operation. On *post-mortem* examination extensive basal meningitis, with thick pus on the surface of the brain was found. The roof of the tympanum showed a limited erosion, but the lateral sinus was intact.

(b) A specimen of a HYDROCELE OF THE CORD removed intact, along with a tubercular testicle from a boy of three.

2. *Dr James Carmichael* exhibited the brain from a case of CERVICAL OPISTHOTONOS IN AN INFANT and accompanying photograph of the patient. The brain was found to show, in a very marked manner, the appearances usually found in such cases—chronic basal non-tubercular meningitis. The two adjacent lobes of the cerebellum were adherent to each other and to the back of the medulla oblongata, so that the outlet for the cerebro-spinal fluid through the foramen of majendic was completely closed, producing an acquired hydrocephalus. The infundibulum was distended, and formed an ovoid tumour about the size of a large cherry, which had stretched the optic chiasma and atrophied it. The case showed opisthotonos in an extreme degree for a fortnight before death.

### III. LANTERN DEMONSTRATION

*Dr Alexander Bruce* gave a lantern demonstration illustrating the endogenous fibres in the lumbo-sacral region of the cord.

### IV. ORIGINAL COMMUNICATION

#### 1. ON THE ENDOGENOUS OR INTRINSIC FIBRES IN THE LUMBO-SACRAL REGION OF THE CORD

By ALEXANDER BRUCE, M.A., M.D., F.R.C.P. Ed., &c., Assistant Physician to the Royal Edinburgh Infirmary, Lecturer on Pathology at Surgeons' Hall

FOR a number of years after it was ascertained that the posterior columns of the spinal cord were composed of two great tracts—an internal (column of Goll or postero-median



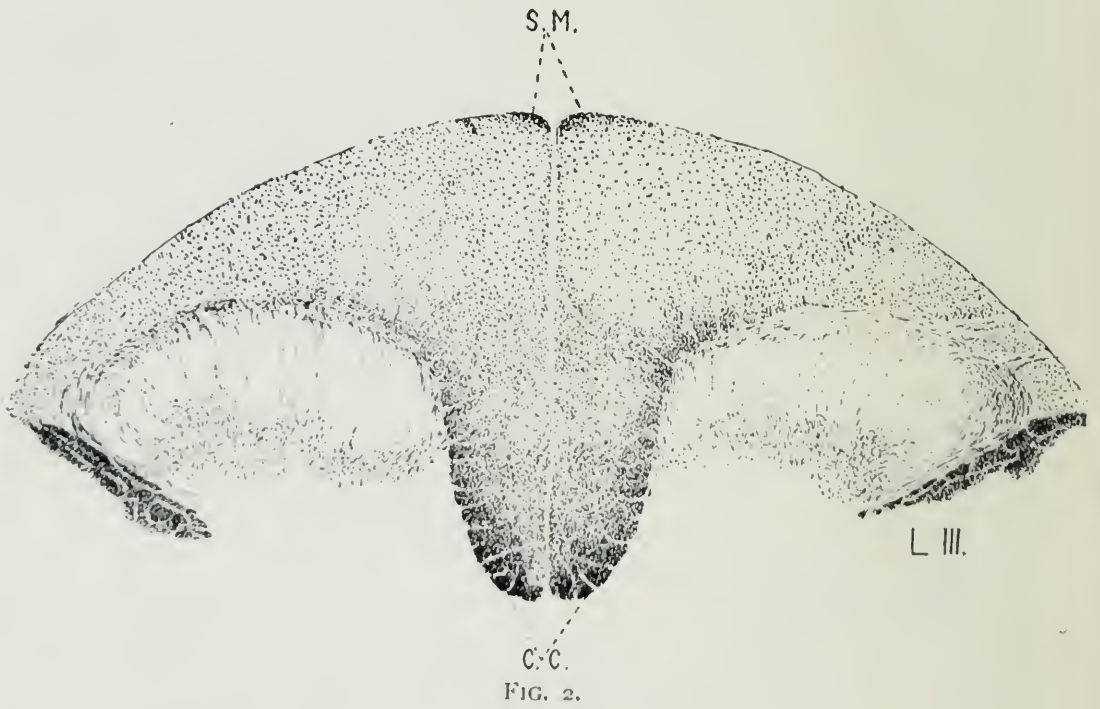
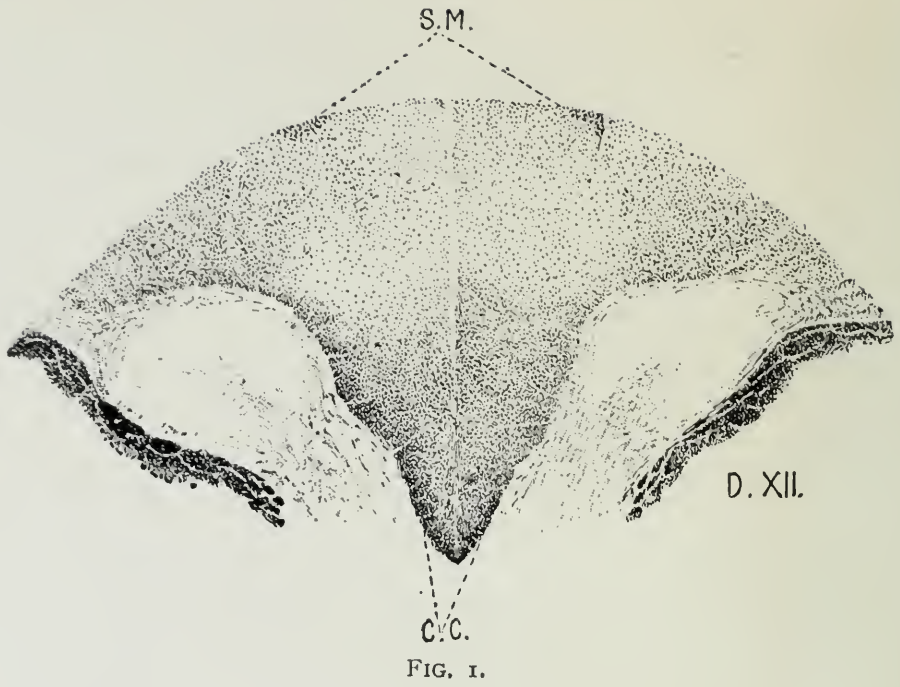


PLATE I.—TO ILLUSTRATE DR BRUCE'S PAPER ON THE ENDOGENOUS FIBRES OF THE CORD.

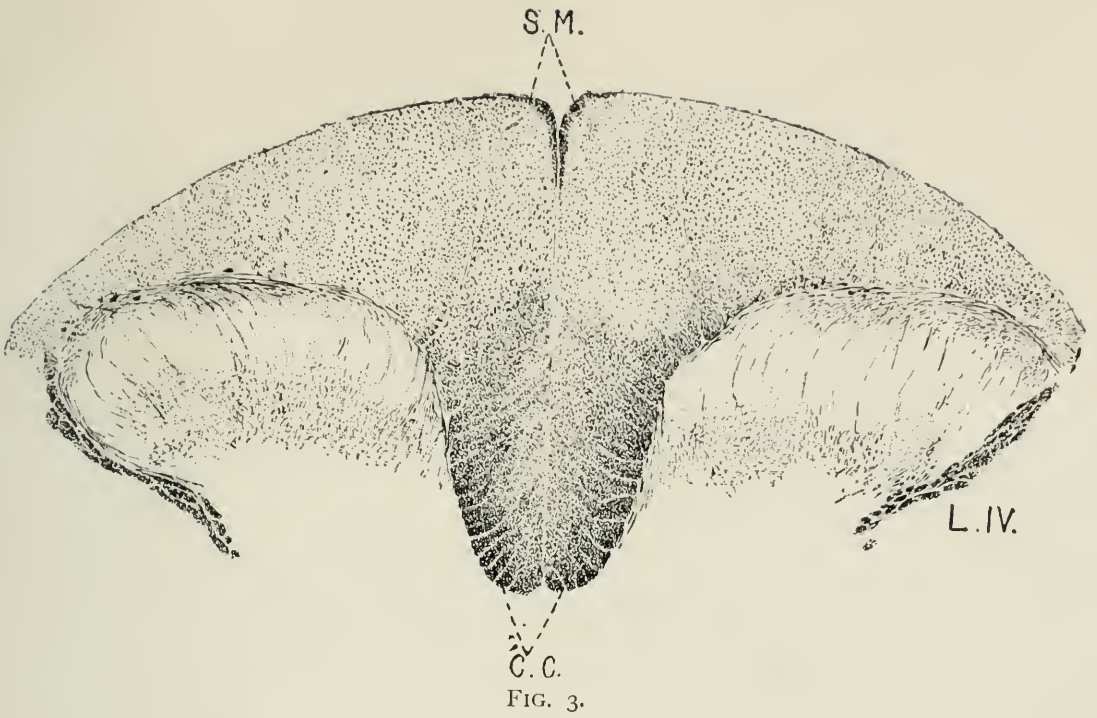


FIG. 3.

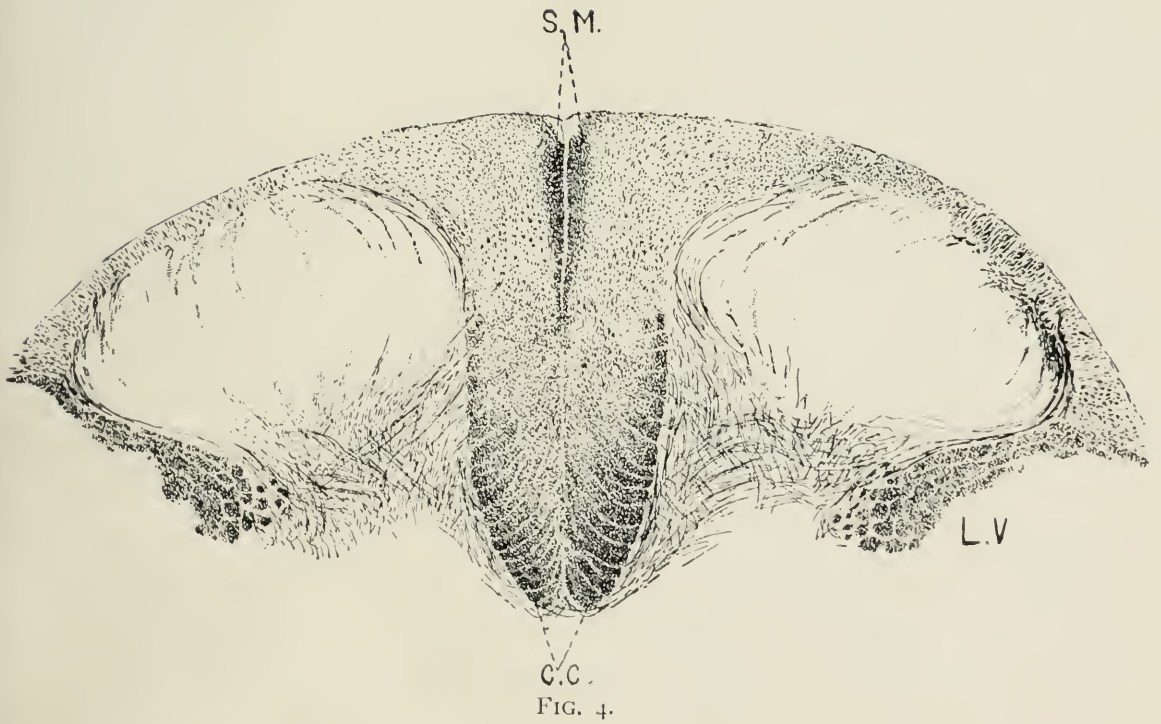


FIG. 4.







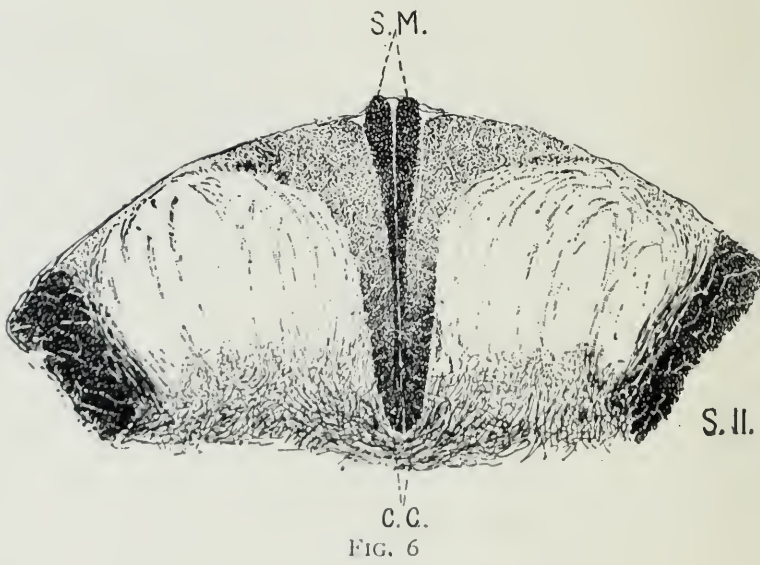
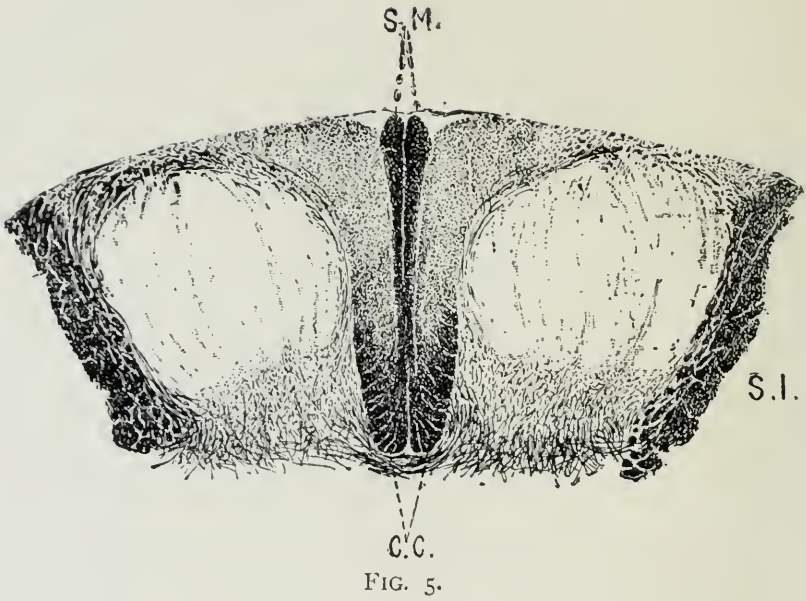
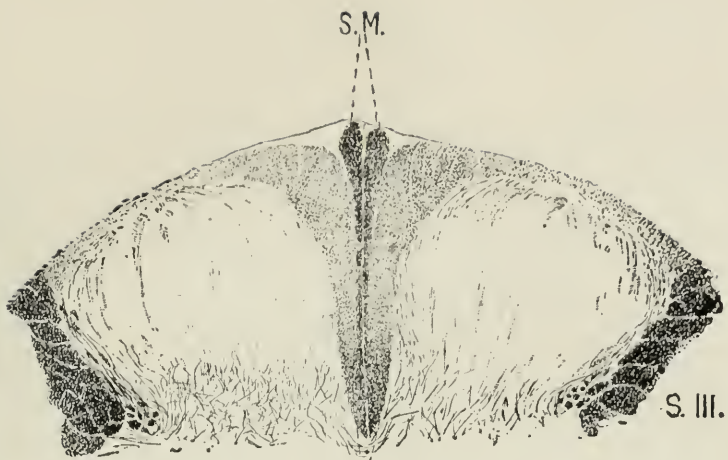
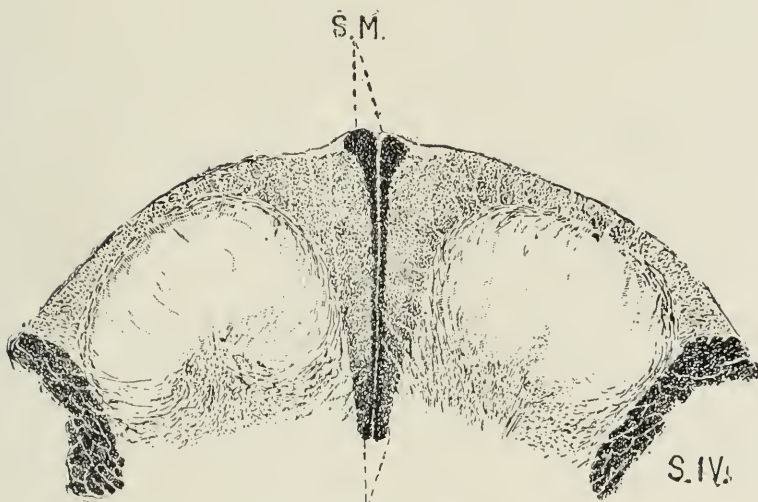


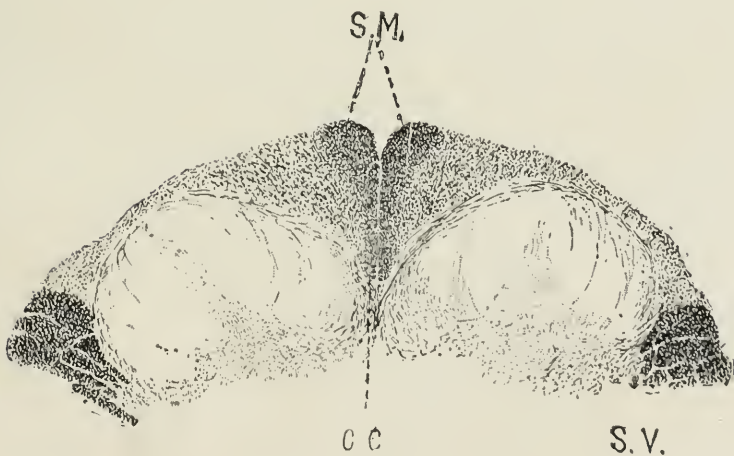
PLATE III.—TO ILLUSTRATE DR BRUCE'S PAPER ON THE ENDOGENOUS FIBRES OF THE CORD.



C.C.  
FIG. 7.



C.C.  
FIG. 8.



C.C.  
FIG. 9.

PLATE IV.—TO ILLUSTRATE DR BRUCE'S PAPER ON THE ENDOGENOUS FIBRES OF THE CORD.



column) and an external (column of Burdach or postero-external column)—it was generally supposed that these two tracts were found in the lumbar and sacral regions as well as in the cervical and dorsal portions of the cord, in which they were first described. Some text-books of anatomy and nervous diseases still make this statement, or if they do not do so directly, at least leave this opinion to be inferred. It has gradually, however, come to be recognised that this view is erroneous, and that in the lumbar and sacral regions it is not possible to separate a distinct postero-median column from a postero-external column in the same manner as can be done in the dorsal and cervical regions in cases of ascending degeneration. The differentiation of the two tracts does not become completed until the level of the eleventh dorsal segment is reached. Below this level the long, intermediate, and short ascending fibres (of Singer and Münzer) are intermingled, since the long fibres which pass from the lower posterior root ganglia to the medulla have not yet all reached the position near the posterior median septum which they ultimately occupy when they enter the postero-median column. In the second place a considerable proportion of the fibres of the column are not continuous with the posterior roots, but are derived from nerve-cells in the grey matter of the cord itself. These fibres have been termed by Marie *endogenous* fibres, and it is to these that this article is devoted.

These *endogenous* fibres form two very well-marked tracts, one lying in the anterior part of the posterior column in close apposition to the posterior cornu, commissure and septum; the second in immediate relationship to the posterior median septum, and in part to the surface of the cord. The former of these has been termed by Marie (1) the *cornu-commissural tract*, to indicate that it was regarded as connecting different levels of the grey matter of the cord. The German title dorsales Hinterstrangsfeld, indicates its topographical relations. The second tract has been termed by Dr Muir and myself (19) the *septo-marginal tract*, the name being designed to indicate its relationship to the posterior median septum, in the same manner as the sulco-marginal tract of Marie is related to the anterior median sulcus. Obersteiner has also termed this tract the dorso-median sacral bundle (dorso-medianes sacral-Bündel) and Edinger has called it the medianes Hinterstrangsfeld.

In order that a set of fibres may be regarded as of endogenous origin, there must firstly be an absence of degeneration in it when the posterior roots (or exogenous fibres) are divided or destroyed ; and (secondly) it should itself degenerate when that portion of the grey matter from which it arises is atrophied or softened. These two conditions hold good in the case of both of the tracts mentioned.

The *cornu-commissural tract* is spared in locomotor ataxia (which is now by very many neurologists recognised as a disease of the posterior roots), even in its advanced stages, and in injury to or compression of the cauda equina. On the other hand, it is found to undergo degeneration in conditions which lead to the atrophy or degeneration of the cells in the posterior cornu. Thus Ehrlich and Brieger, and Singer and Münzer (4), after causing necrosis of the nerve-cells of the lumbo-sacral region by compression of the abdominal aorta, and thus cutting off their blood supply, found a distinct but somewhat diffuse degeneration throughout the whole of the posterior columns, but most marked in the anterior part of these columns. In pellagra, which is regarded as a disease of the grey matter of the cord, Tuzek (10) and Marie (1) found it distinctly affected. Still more recently Schlesinger (11) has shown that it is frequently degenerated in syringomyelia, a disease which tends to destroy the grey matter, especially that portion of it in proximity to the central canal. Lastly, Fajersztajn (9) has shown that it is composed of fibres of short course, the majority of which have a descending direction. On the other hand, Déjérine and Spiller (7) maintain that it contains a considerable number of ascending fibres derived from the posterior roots.

Sections derived from advanced cases of locomotor ataxia are particularly well suited for the study of this tract. When these are stained by Weigert-Pal's method it stands out with great distinctness against the degenerated fibres. It extends through the whole of the lumbo-sacral region of the cord, being traceable from the lowest dorsal segment to the extreme tip of the conus medullaris. It attains its greatest size at the level of the lower lumbar region, and diminishes somewhat rapidly above and more gradually below this level. Throughout its whole longitudinal extent it stands in close relation to the posterior commissure, and (except perhaps in the lowest sacral

segment) to the anterior part of the inner margin of the posterior cornu. Its inner margin, below the third lumbar segment, lies in contact with the posterior median septum. Above this it becomes gradually displaced outwards by the ascending fibres of the posterior roots of the lower spinal nerves, as they pass upwards to enter the postero-median column. When this latter column is fully developed, *e.g.*, at the level of the eleventh dorsal segment, what remains of the cornu-commissural tract is displaced from the septum completely, and also from that portion of the posterior commissure which lies immediately in front of the tip of the postero-median column. Posteriorly the tract has no definite margin. Its outer portion merges gradually into the part of the column behind it (the so-called middle root-zone of Flechsig), while in the neighbourhood of the septum, below the level of the first sacral segment, its inner portion becomes fused with the septo-marginal tract, in such a way that in sections derived from ataxia it cannot be determined where the one ends and the other begins.

A fuller idea of the topographical relations of the tract may be obtained by a study of Figs. 1 to 9, which have been made from careful drawings of Weigert-Pal's sections of an advanced case of ataxia. It will be seen from these that at the fifth sacral segment (Fig. 9), the tract is in contact with the posterior commissure and the anterior part of the septum, but that it does not quite reach the cornu, being separated from it by a narrow area of degenerated fibres. Posteriorly it passes, without any line of demarcation (Fig. 9), into the septo-marginal tract, appearing to form with it a continuous tract extending from the commissure to the periphery.

At the fourth sacral segment (Fig. 8), the external margin has reached the cornu and extends along it backwards as far as the gelatinous substance of Rolando. The other relations are unaltered. The tract is not yet of any great extent, and the apex of the column is narrow and pointed.

In the upper sacral segments (Figs. 7, 6, 5), the tract has considerably increased in size. The external margin extends further backwards along the posterior cornu, and the inner border passes along the septum to become fused with the septo-marginal tract.

At the fourth and fifth lumbar segments (Figs. 4 and 3),

at which levels, as already stated, the tract seems to have attained its maximum size, the inner margin does not extend so far along the septum, and is now distinctly differentiated from the septo-marginal tract. This latter is now limited to a small area at the posterior half of the septum. The separation of the two tracts seems to be effected by the ascending (in this case degenerated) fibres of the posterior roots, which are becoming applied to the septum in their passage upwards to aid in the formation of the column of Goll. As additional fibres from the posterior roots become applied to these at higher levels (upper lumbar, Fig. 8), the separation of the cornu-commissural and the septo-marginal tracts gradually increases (as in ataxia these root-fibres are degenerated the intervening space is paler than either of the tracts in question). The cornu-commissural tract is also displaced outward, till at the twelfth and eleventh dorsal segments (Fig. 1), it comes to form a narrow band bordering the posterior commissure and grey matter of the posterior cornu.

Above this level it is not easy to distinguish it as a distinct tract, but it apparently diminishes rapidly in size. The fibres which compose it can be seen entering it from the grey matter of the posterior cornu, and almost exclusively from that of the same side.

The *septo-marginal descending tract* also remains undegenerated in ataxia, and its position very closely corresponds to the area of fibres which Dr Muir and I (19) found to degenerate after a crush of the cord at the level of the upper lumbar segments. In this case very little degeneration was found in the cornu-commissural tract, an evidence that the greater part of the fibres of the latter arise below this level, while many of the septo-marginal tracts have a higher origin. This is in agreement so far with Hoche's observations as to the high origin of the tract. (The lesions in Hoche's cases were respectively below the level of the eighth cervical, and between the fourth and fifth dorsal segments (14).) It also enables us to indicate where the septo-marginal and cornu-commissural tracts meet each other. The fact that it has degenerated in a downward direction, renders it quite certain that it is not an upward continuation of posterior root fibres, and this has been corroborated by the observation of Pineles (23), that it remains unaffected in ataxia affecting the sacral segments. It stands out from the



degenerated fibres in the lumbo-sacral portion of the cord even more distinctly than does the cornu-commissural tract.

At the level of the lowest sacral root (Fig. 9), the undegenerated area in question is situated at the postero-internal angle of the posterior column. It forms a racquet-shaped area, or a triangle with the edges rounded off, two of its sides being applied to the posterior median septum, and to the periphery respectively, and the third forming a somewhat indefinite margin between the degenerated and undegenerated parts of the cord, which at this level are not sharply differentiated from each other. The anterior angle of the tract seems to merge into the undegenerated area lying in the anterior part of the column;—the cornu-commissural tract. The remainder of the posterior columns is not so degenerated as at higher levels, so that the healthy areas do not stand out so clearly. In the next segment, the fourth sacral (Fig. 8), the tract has greatly altered. It has become narrower, and much elongated antero-posteriorly. In the greater part of its extent it forms a very narrow band along the posterior median septum, which as it nears the periphery, suddenly widens out into a club-shaped head. This head is rendered more prominent by the apparent shrinkage of the degenerated areas of the column, which produces a retraction of this part of the periphery of the cord from which the rounded club-like head of the tract projects boldly, the depression thus formed in the outline of the cord being filled in by the connective tissue and vessels of the thickened membranes. It is seen in the illustration as a pale area on the outer side of the projecting head. At this level the undegenerated area is very distinctly marked off from the remainder of the column. In the third sacral segment (Fig. 7), there is very little change in the appearance of the tract, what change there is being in the shape of the head. This, instead of being rounded, is almost pointed, like the head of a broad spear, and projects further beyond the remainder of the column than in the former section. The recession of the periphery is deeper and more angular, and is as before, filled up by the thickened membranes. In this, as in the previous sections, the anterior end of the tract becomes merged in the fibres of the undegenerated cornu-commissural tract.

At the level of the upper sacral segments (Figs. 6 and 5), the tract has become distinctly larger, the band along the pos-

terior median fissure being broader and the head also larger. The head still retains its pointed appearance, but does not project beyond the general line of the periphery of the cord: the angular depression at its outer side is still filled up by connective tissue. The tract continues to be sharply differentiated from the remainder of the column and to merge in the cornu-commissural tract anteriorly.

When the fifth lumbar segment is reached (Fig. 4) there is again a great change in the appearance of the tract. It has greatly diminished in extent, now occupying only about a third of the length of the posterior median fissure instead of the greater part of the length; and, further, it no longer reaches either the cornu-commissural tract or the periphery of the cord, but forms a narrow tract, with a rounded posterior extremity and tapering to a point anteriorly. Roughly speaking, the shape resembles that of an Indian club. The broad posterior end bulges somewhat toward the posterior median septum, beyond the general surface, and a small interval is thus formed behind it, between the two posterior columns; this is filled up by connective tissue as in the previous sections. At this level the tract corresponds fairly closely to the "oval field" of Flechsig.

In the fourth lumbar segment (Fig. 3) the tract is further diminished in size, and altered in position. It has passed backwards again, and forms an angular band outlining the postero-internal angle of the cord, one limb being placed along the periphery, the other along the posterior median septum for rather less than a fifth part of its extent. The tract is thus separated by a considerable interval from the cornu-commissural tract, which is well marked at this level.

In the segment above this, the third lumbar (Fig. 2), the tract is still diminishing. It is no longer applied to the posterior median septum in any of its extent, but forms a very small, narrow band, of which one extremity touches the middle line, the other terminates gradually a short distance along the periphery. The tract has now become scattered, with no very definite line of separation from the degenerated areas.

The final position taken up by the tract is seen at the level of the twelfth dorsal segment (Fig. 1). Here the tract is represented by a small group of fibres, somewhat triangular in shape, placed at the periphery of the cord, about

one-third of the distance from the middle line to the posterior roots. The fibres are few in number, but constitute a perfectly well defined tract seen in many successive sections. Lying anterior and external to it is an area containing more diffusely scattered healthy fibres.

The tract cannot be traced clearly higher than this level in cases of locomotor ataxia, but Hoche's case of degeneration after a lesion in the lowest cervical segment (14) has proved that it may originate as high as this. Above the eleventh dorsal segment, however, it appears to become diffused within the hinder part of the postero-external column, and is therefore not so easily followed as at lower levels. The evidence as regards its origin is still thus insufficient, and it can only be said at present that the tract originates in part in the higher segments of the cord, gains greatly in bulk about the level of the first sacral segment, and terminates in the lower sacral and the coccygeal region, by sending fibres forward along the posterior median septum into the grey matter near the central canal where they are lost amongst the other fibres in this part. The endogenous nature of many of its fibres is proved by the fact that in the case of ataxia described by the writer, there was a great accession to the number of its fibres at the first sacral segment, in spite of the almost complete degeneration of the posterior roots for some distance above and below this level.

It is very probable that at one part of its course, *i.e.*, in the lower lumbar segments, the tract corresponds to the "oval field" described by Flechsig, since at this level it occupies a small area close beside the posterior median septum and at some distance from the periphery, which when taken together with its fellow of the opposite side is oval in form. The discrepancies in the descriptions given by the various authors as to the exact level at which this oval field appears are no doubt due in part to differences in the situation and nature of the lesion and in part to the different methods of staining employed. This also applies to some other slight differences in the descriptions.

The tract is undoubtedly mainly a descending one, but Déjérine and Spiller have concluded that it also contains some fibres which degenerate upwards after injury to the cauda equina. This is very probable, but there are as yet

so few cases on record in which this tract has been accurately described, that on this and on many other points it is quite impossible as yet to form a definite conclusion.

As regards the cells from which the cornu-commissural and the septo-marginal tract are derived, it is not possible as yet to make a definite statement.

Cajal first showed that in the chick some cells of the posterior horn sent their axis-cylinder processes to the posterior columns, and Lenhossek has been able to demonstrate similar cells in the guinea-pig, etc., as well as in the human embryo. They are situated at the base of the horn and in the Rolandic substance. None of the cells of Clarke's column send their processes to the posterior column.

With regard to the function of these two tracts nothing definite can be stated further than that they are longitudinal and commissural in character. Their position strongly points to their being connected with the lower organic reflexes.

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## DESCRIPTION OF PLATES.

The lettering is the same throughout.

*c.c.* = Cornu-commissural tract.

*s.m.* = Septo-marginal tract.

The figures are reproduced from drawings of the posterior columns made by Dr Jessie M. MacGregor.

- FIG. 1.—Level of twelfth dorsal segment.  
 FIG. 2.—Level of third lumbar segment.  
 FIG. 3.—Level of fourth lumbar segment.  
 FIG. 4.—Level of fifth lumbar segment.  
 FIG. 5.—Level of first sacral segment.  
 FIG. 6.—Level of second sacral segment.  
 FIG. 7.—Level of third sacral segment.  
 FIG. 8.—Level of fourth sacral segment.  
 FIG. 9.—Level of fifth sacral segment.

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### Meeting XI.—July 7, 1897

Dr ARGYLL ROBERTSON, *President, in the Chair*

#### I. ELECTION OF MEMBER

Dr J. Frank Crombie, North Berwick, was elected an Ordinary Member of the Society.

#### II. EXHIBITION OF PATIENTS

1. *Dr William Stewart* exhibited a patient after operation for DRAINAGE OF DILATED LATERAL VENTRICLE. A full account is given of this case in Dr Stewart's paper read at this meeting.

2. *Dr Norman Walker* exhibited—

(a) The case of SCLERODERMA exhibited for him at the previous meeting. In the various journals he saw that he was reported to have said that the disease was getting well under thyroid. He had not intended to give this impression. Certainly the case was improving, but to what the improvement was due he was not prepared to say. During the past month Dr Laing had kindly taken the case under his charge for thorough massage, and the results were remarkably good; especially where the process was deep, and the whole of the

tissues were bound down, there had been very marked improvement. The band which existed on the upper arm was more soft and pliable, and the patient could use her arm more freely than before. The thyroid had been continued in the same doses as before.

(*b*) A case of LUPUS ERYTHEMATOSUS which had been under his care for eleven months, and which had almost disappeared, leaving very little scarring, under the use of oxidised pyrogallic acid, as recommended by Unna. He had ordered a 10 per cent. solution, but finding that other cases did not do so well as this one, he examined the patient's prescription, and found that by a mistake of the clerk a 1 per cent. solution had been ordered instead of 10 per cent. Since then he had treated other cases with 1 per cent. solution with benefit. He used it dissolved in acetone collodion.

(*c*) Another case of LUPUS ERYTHEMATOSUS which he had first seen only the week before, and in which he had tried Schütz's treatment with diluted Fowler's solution. Instead of producing irritation, as that author describes, the application had had a markedly soothing and beneficial effect, so that though the effect produced was not that expected, he intended to continue the treatment.

(*d*) A case of very extensive VITILIGO in a little girl of eight. The disease commenced three months ago without any apparent cause, and was rapidly getting worse, the whole interscapular region being bleached, and large spots being present on other parts of the body. Curiously, the hairs in the affected regions were not bleached as usual. The patient had been put on suprarenal extract.

3. *Mr J. M. Cotterill* exhibited—

(*a*) A case of GASTROENTEROSTOMY—a young woman of 26, who for six months had suffered from gastric symptoms. When admitted to Mr Cotterill's wards there was great dilatation of the stomach, and a large hard mass could be felt at the pyloric end of the stomach. The patient had severe pain in the stomach after meals and frequent and distressing sarcinous vomiting. Emaciation was progressing rapidly, and the patient's condition was a most wretched one. The operation of gastroenterostomy gave immediate relief to all the symptoms, the gastrodynia and vomiting stopping immediately after

the operation. The stomach was attached to the bowel by means of a Hayes' bobbin, which Mr Cotterill uses in all such cases now, and thinks very highly of.

It was found when the growth was exposed that it was, as was expected, carcinomatous in character, and far too extensive to render pylorotomy feasible, the tumour invading two-thirds of the anterior wall of the stomach. Since the operation the patient had gained considerably in weight, and was now apparently in perfect health, except for the tumour which could still be felt.

(b) A case of ENTERECTOMY. A boy of five, who for several months before admission had suffered from swelling of the abdomen and gradually increasing difficulty in getting the bowels moved. When admitted to the wards he had frequent severe spasms in the abdomen, accompanied by severe pain, gurgling sounds, and very marked "laddering" of the intestines. Laparotomy was performed, and a stricture of the bowel was discovered situated about one inch below the ileo-cæcal valve. The stricture was fibrous in character, and was apparently the result of contraction following a tubercular ulceration of the bowel. The small intestine was enormously hypertrophied. About 10 inches of intestine were removed, including the strictured portion. Hayes' bobbin was used in this case also.

The child had a movement three days after the operation, and passed the fragments of the bobbin on the fourth day. He left the Infirmary perfectly well on the fourteenth day, and has gained very much in weight during the last two months.

4. *Dr Alexander James* exhibited two cases of CEREBRAL HEMIPLEGIA in young subjects. He pointed out that some months ago he had shown a case of this kind in a girl of nineteen years, and stated that since then no less than three similar cases had come under his notice. The first was in a little girl of twenty-eight months, the second in a little girl of thirty-two months, and the third in a man of thirty-one. Of these he could show at this meeting the second and third. In all the cases the appetite had come on after a febrile attack, hence the name often applied to it, *post febrile hemiplegia*. In the man's case the appetite had come on two years ago, in the little girl's about two months ago. In all the cases the left was

the side affected, and although fore-arm and leg had been involved at first, the arm had recovered to the least extent. In all the cases the muscles of the affected parts were well nourished, and being usually in a state of cramp-like contractions they felt firm and hard. In the case of the man the cramp-like affection of the arm had kept the limb firmly adducted to his side for months, and the spasmodic contraction of the thigh and limb muscles was often so great as to prevent knee and ankle jerks being elicited. A very similar condition prevailed in the girl. In both cases the muscles completely relaxed during sleep, and the acts of yawning or stretching limbs on waking caused movements of arms and fingers which the patients could not voluntarily perform. Dr James considered that in such cases the lesions were at or near the cortex, and he was inclined to think that they depended on an encephalitis rather than on the one basis.

In the girl's case great improvement had resulted from treatment directed to re-educate the cortical centre of the affected arm by tying up the sound one.

### III. EXHIBITION OF SPECIMENS

1. *Dr Allan Jamieson* exhibited some MICROSCOPIC PREPARATIONS illustrating the mode in which the Trichophyton invades the hair. He said that when in 1887 the results of his observations on this point were published, his views were not universally accepted. They were, however, adopted by Unna, and Aldersmith endorses them. At that time the conception of the elaboration of toxins by micro-organisms was still in its infancy. The method of staining the parasite of ringworm introduced by Morris has rendered more exact examination possible. When the Trichophyton is implanted on the scalp or chin, it first throws out its mycelial filaments, which, insinuating themselves in the upper layers of the epidermis, give rise to itchiness, hyperæmia, and parakeratosis or scaliness. It is not long till, insinuating itself within the follicular mouth, it proliferates in the root-sheaths occupying the superior funnel-shaped portion. In this confined situation, by means of the toxin which it elaborates, œdematous swelling of the hair occurs, and loosening of the cuticular scales. As these are imbricated from below upwards and outwards, the



mycelium in its growth downwards impinges on the projecting edges of the sheathing scales and by raising them up gains access to the interior of the hair. There it grows freely, breaking up the component fibres, and, at least in the case of the scalp hairs, rendering them brittle. The larger, more succulent hairs of the beard are rather loosened than made friable. In the specimens placed before you it is possible to see (1) The proliferation of the fungus in the root-sheath ; (2) The elevation of the cuticle of the hair by the mycelium, which is thus making its way into the interior. One other point is of interest. The fungus here seen belongs to the microsporon variety rather than to the megalosporon. Its spores have only a diameter of 3 to 4 micro-millimetres. It apparently belongs to the variety which gives rise to fully 95 per cent. of all cases of ringworm of the head in children, but which has not been held by Sabouraud as that causing tinea barbæ. The disease had only lasted a week when the man presented himself for treatment. There was but one spot on the chin the size of a sixpence. A week later, after treatment with a sulphur and ammoniated mercury ointment, though the hairs were still loose, neither by staining nor soaking in liq. potassæ could any trace of the fungus be found, showing that its hold is not a tenacious one in an uncongenial soil, though extremely difficult to dislodge in the contrary condition, as on the heads of children under fourteen.

2. *Dr Norman Walker* showed a section of a COMEDO showing the bacilli recently described by Sabouraud as being the cause of acne as well as of alopecia areata. In staining hairs from a very severe and acute case of alopecia areata, some months ago, he had found hairs surrounded with the bacillus apparently the same as Sabouraud described, but unfortunately he had been unable to lay hands on it for demonstration that evening.

3. *Dr Alexander Bruce* exhibited—

(a) Specimens of the DISTOMA SINENSE which had been sent to him from Dr Welch of the Straits Settlements. These parasites had been removed from the biliary passage of a lunatic who had died of pneumonia.

(b) TRICHOCEPHALUS DISPAR and of the ANKYLOSTOMA

DUODENALE, which he had received from Dr Kerr of Penang. The latter parasites were seen adhering to the catarrhal mucous membrane of the duodenum under the folds of the valvulæ conniventes. Their ora were also demonstrated under the microscope.

(c) A specimen of UNILATERAL PACHYMENINGITIS HÆMORRHAGIA.

4. *Mr J. M. Cotterill* exhibited a specimen of a LARGE VULVAR CYST, which he had removed from a woman aged 51. The tumour had invaded the labia majora and clitoris, and presented an appearance resembling a large scrotum and penis. A photograph of the case was shown.

#### IV. EXHIBITION OF INSTRUMENT

*Dr Alexander James* exhibited an instrument for registering the viscosity of the urine. It consisted of a toothed wheel, to the axle of which was attached a weight, by means of which it could be made to revolve. It was held by an escapement arrangement, to which was connected a little pan at the end of a short lever. From a pipette urine was allowed to drop on the pan, each drop thus causing the escape of one tooth. In this way he could record the number of drops which a given quantity of urine took to escape.

Ordinarily the number of drops could be ascertained by counting, but where the subject was being investigated scientifically, large quantities of urine had to be used, and a good recorder would save time, and save also brain and eye strain.

#### V. ORIGINAL COMMUNICATIONS

##### 1. UNILATERAL HYDROCEPHALUS—EPILEPTIFORM CONVULSIONS AND HEMIANOPSIA—DRAINAGE OF LATERAL VENTRICLE

By WILLIAM STEWART, M.D., Surgeon to Leith Hospital

M. R., æt. twenty. His mother informs me that he was a first child, born after a tedious labour, in which, however, forceps were not employed. He was a quiet baby, and until he was six months old he would laugh to no one except his

father. Both his father and his mother independently say that at the age of eighteen months, when he was looking out of the window at objects passing in the street, he invariably turned his eyes to the left, although the objects were coming straight in front of him. Nystagmus was noticed by a medical man at the age of three. His mother noticed that his head was larger than that of children of a corresponding age, and that the right side was larger and more prominent than the left.

With these exceptions, nothing particular was noticed during his early boyhood or school-days. He was a scholar of more than average ability and intelligence; and about the age of sixteen was employed as a clerk, and did his work so well that he was entrusted with the collection of considerable sums of money.

At the end of 1888 he complained of defective vision, and was found to be suffering from myopic astigmatism, and ordered glasses.

R.		L.	
Sph.	Cyl.	Sph.	Cyl.
-1D	-1D	-0.75D	+1.5D
Axis horizontal.		Axis vertical.	

In *April* 1894 he had his first fit, of a severe epileptiform character, which lasted half an hour, and in which he bit his tongue. From this time he had usually seven or eight in a week; in one week he had eighteen, some of them being more of a cataleptic nature. One, which I witnessed, lasted about an hour and a half, and while in it his limbs could be placed in all sorts of curious positions, and these positions were rigidly maintained. At first the fits seemed to be more frequent during the night, and he could tell that he had had one by his bitten tongue and the involuntary evacuations. He was always exhausted after them: had no aura, unless it were that sometimes he felt a slight pain in the left elbow, and at other times had a feeling of giddiness in which the room seemed to turn from right to left. After the fit he had always severe pain in the head, referred every time to that part of the scalp where the hair naturally forms a whorl. His mental condition became one of great irritability, and in coming out of the fits he had sometimes impulses to violence; at times was homicidal, and once or twice spoke as if he had had suicidal impulses.

There was no evidence of any specific taint, and the appearance of the other children in the family was quite healthy.

After a prolonged and varied treatment with drugs, he was admitted to Leith Hospital on the 13th July 1896.

*Condition on admission.*—Pulse 76; temperature 98.2. Intelligence good. Facial expression dull and heavy. Nystagmus and slight stammering. Motor, reflex and trophic functions normal. Right half of head larger than the left, and the right parieto-occipital region is more prominent, and is tender on percussion.

*Special senses:*—*Sight.*—Nystagmus present in a well-marked degree. Pupils equal, and react well to light and accommodation. Requires the spectacles before referred to for reading. *Field of Vision.*—Distinct left homonymous hemianopsia. Sense of colours all right in field of good vision. Ophthalmoscopic examination.—Fundus healthy. *Hearing, smell, taste, touch* normal.

Does not sleep well, and talks much during sleep. Urine sp. gr. 1024; no abnormal constituents found. Nothing of special interest in other systems.

On the 13th July had a fit. The following is the nurse's report:—"While the patient was lying quiet, the eyes turned to the left, and the arms and fingers stuck out in a rigid manner. Every now and then he twitched his head and left arm about. Eyes at times rolled to the right. Legs not so rigid as the arms. Pupils dilated. Fit lasted five minutes, and on coming out complained of severe pain in the back of his head." 14th—Two fits. 15th—Four fits, each lasting about ten minutes, in one of which his arms remained rigid in any position in which they were placed. 16th—Two fits. 17th—One fit. 19th—Had a fit which partook more of the epileptic character.

After this he had usually two fits daily, with the exception of the 24th, on which date he had five, lasting about ten minutes each.

On the 22nd July Dr Bennett examined him, and found left homonymous hemianopsia. 31st July.—Dr Sym reports: "Left field much restricted for all except light, *i.e.*, for movement and form sense. Seems to have almost no colour field to left. Red perceived only a small way to the left of the fixa-

tion point; no other colours. Pupils react to light. Fundus normal. Discs a little pale, equally so. No evidence of any neuritis."

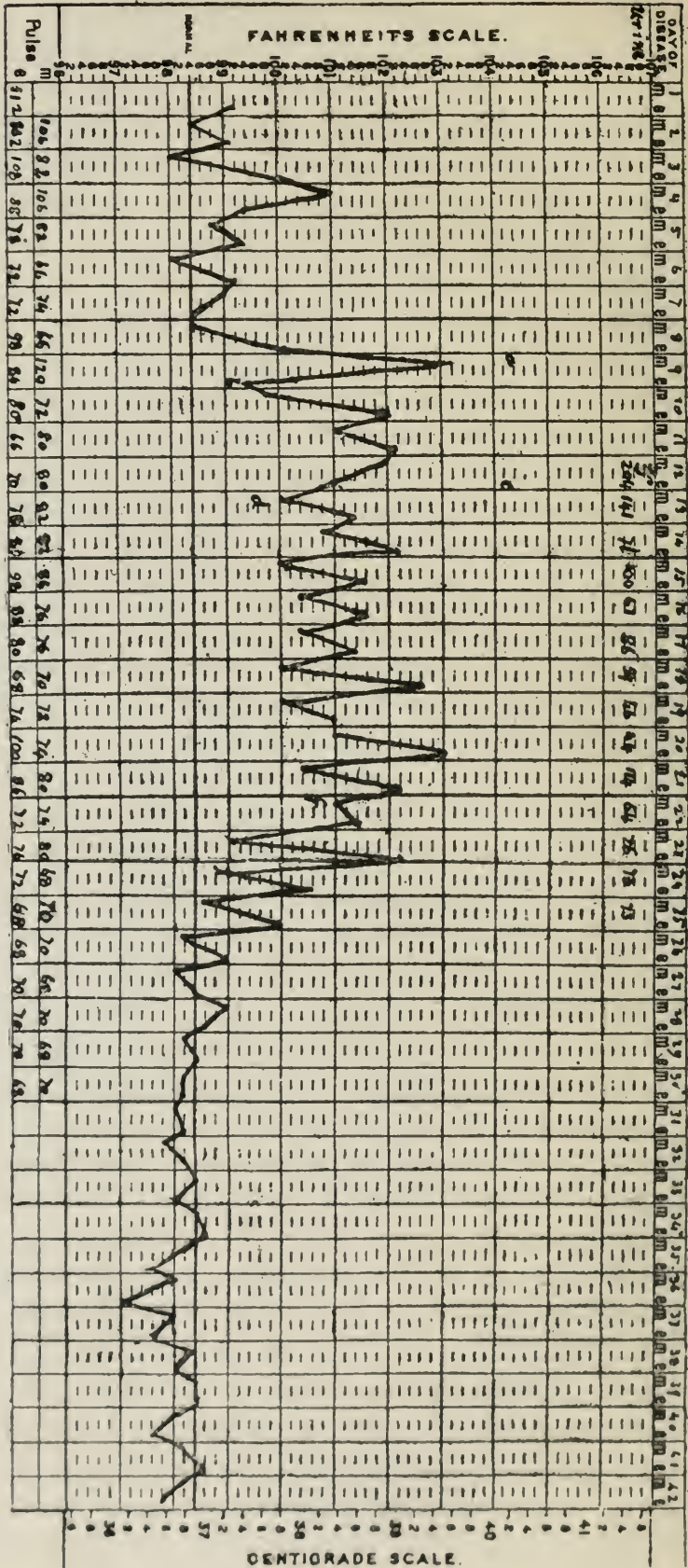
Patient was discharged from Hospital on the 13th August. After his discharge the fits became more frequent and of a severer type: the pain in the head was worse and lasted longer, and his mental condition deteriorated.

22nd September.—Dr Sym reports: "Now complete left hemianopsia, not absolute loss of light vision. Nystagmus more marked on eyes looking to the right than to the left; most marked when eyes are moved to right, little but distinct when eyes are central, almost none when moved to left; on up and down movements practically none. Marked hippus. Contraction of pupils equally good on both sides of the field. Fundus good."

In view of this above report from Dr Sym it was resolved, in consultation with Dr Elder and Mr Miles, to trephine that part of the skull that would give us the nearest access to the inner surface of the occipital lobe, and with this object the patient was re-admitted on the 28th September.

Operation, 1st October.—The point was localised by Mr Chiene's method, and the trephine was applied midway between the  $\frac{3}{4}$  and  $\frac{7}{8}$  points, the inner edge of the trephine being one inch from the middle line; it having been ascertained by experiment on the cadaver that this distance would be requisite in order to avoid all risk of injury to the longitudinal sinus. On removal of the disc of bone, which was very thick at one part, the dura bulged into the opening. On dividing this the surface of the brain also bulged into the opening, and though pale looking showed no great departure from the normal appearance. On being incised, however, the cerebral tissue, of no greater thickness than a sheet of blotting-paper, was found to overlie a large cavity from which a large amount of fluid having all the appearances of cerebro-spinal fluid escaped. The anterior wall of this cavity could not be reached by introducing the forefinger to its full extent, but on the inner side and to the back and also downwards and outwards smooth walls were felt. There was, therefore, no doubt on our minds that this was the lateral ventricle. A small indiarubber drainage tube was introduced, and, as the patient had signs of grave collapse after the

TEMPERATURE CHART OF DR STEWART'S CASE.



- a. Tube blocked, no discharge.
- b. Cerebro-spinal fluid discharging freely.
- c. Tube removed.
- d. Still discharging freely.
- f. Discharge of cerebro-spinal fluid ceased.

withdrawal of the fluid, two artery forceps were left on large veins of the dura, and the wound dressed with sterilised gauze, without being sutured. The operation was conducted on aseptic lines, no antiseptics being used.

*Progress of case.*—Patient remained asleep for an hour after being put to bed, and after that his pulse was 107, feeble but regular. On awakening he volunteered the remark that “he could see better, that his eyes were as if they had been polished, and can see further away.” He had to be dressed in six hours after the operation on account of the large amount of fluid escaping. The forceps were removed in forty-eight hours and the flap sutured, leaving space for the drainage tube. The dressings required to be changed four or five times a day on account of the saturation caused by the discharge of cerebro-spinal fluid, and the patient, though suffering pretty much from pain in the head, did well until the eighth day, when, owing to some blocking of the tube, the discharge ceased to flow. He then complained of much pain in his head, the temperature rose to  $103^{\circ}$ , and on examination there was much bulging through the trephine opening. On the drain being re-established the pain in the head subsided, the temperature fell to nearly normal, but on the ninth day it again rose, and continued to range from  $100^{\circ}$  to  $102^{\circ}$  for thirteen days, when it gradually fell to normal and remained so. The pulse during this time ranged from 70 to 90, but did not follow the temperature. During this period of pyrexia he suffered much from pain in the head, referred to no spot in particular, to relieve which hypodermic injections of morphia were required. For six days he had polyuria, passing in one day 204 ounces of urine, and 141 on the following day. The amount of discharge during this time necessitated a change of dressing two or three times daily. The drainage tube was removed on the eleventh day, but the discharge continued, gradually lessening, until the twenty-first day after the operation.

On the 13th October Dr Sym reports: “Pupil reflexes perfect. Fundus *in statu quo*. The light perception perfectly good, but no hand movements visible in half field; condition practically as before.” 27th October.—Dr Sym reports: “His movement field extends to about  $40^{\circ}$  past middle line, and colour field has crossed middle line also.”

The wound being soundly healed, and the patient having

had no fits, he was discharged on the 24th November, seven weeks after operation.

On the 1st *December*, a week later, Dr Sym reports: "Colour perception now crosses middle line 5-10°. Hand movements extend 40° across middle line. Light perceptions to extreme limits of visual field. Left disc very slightly pale. Right disc rather more so, but only slight. Nystagmus *in statu quo*, or rather less than before."

His mother volunteered the statement that before his going into hospital, at end of September, he could not see the time on his watch, after his return he could see to read the *Evening News*.

In the beginning of *January* he became very irritable in his temper, and began to display ill-will towards his younger sister to such an extent as to cause his mother much alarm. He also complained of shooting pains in the cicatrix, which at one point was very tender. His diet was restricted to articles of a non-stimulating nature, and large doses of bromide of potassium were exhibited. This treatment apparently had a beneficial effect, for his irritability passed off, and he continued to improve in general health and in cerebral action.

At the *end of February* Dr Sym reports: "Nystagmus still present to a slight extent on looking straight forward; less on looking to left; more on looking to right, but in no position as bad as formerly. Field of vision for movement extends 45° to left. Field of vision for colour cut off at middle line; seems to be slightly deficient even to the right. Pupils act normally. Slight pallor of outer quadrant of each disc."

By the *middle of March* he was so well that his commencing work again was talked of; but suddenly, on the 7th *April*, he took a severe epileptiform fit, the first since the operation six months ago. He had five that day, and on the following days had more, running up to seventeen and eighteen in one day, in spite of large doses of bromide— $\bar{5}$ ii daily. The fits were very severe; he remained stupid and dull during the intervals, and his strength becoming exhausted, he was re-admitted to Hospital on the 21st *April*. *Operation, 22nd April*.—On reflecting the old flap, the pericranium was found to be adherent in parts to dense fibrous tissue filling up the opening in the bone, this again was adherent to the underlying dura mater. There was, however, no "anchoring" of the brain.



The upper part of this fibrous tissue was reflected and other cicatricial bands freed, and a pair of sinus forceps passed through the brain tissue in the direction of the lateral ventricle. A small quantity of cerebro-spinal fluid escaped, nothing like the quantity that came away at the first operation. A small-sized indiarubber drainage tube was passed into the lateral ventricle and the flap replaced. The patient showed no signs of being affected by the withdrawal of the fluid this time. His temperature never rose. The discharge of cerebro-spinal fluid was very much less than on the former occasion, requiring a change of dressing only after two days, and then after four, and afterwards the change of dressing was not required on account of the soaking of the discharge. The tube was shortened on the 30th *May*, more than a month after the operation; on the 13th *June* it was removed; and on the 16th the wound was firmly healed. On the 20th *June* he had four fits through the night, and one during the day. They were of medium severity, similar to the former epileptiform fits. To have gr. xxx. bromide of potassium three times a day. Since then he has had no return of the fits.

The history, and the condition found at the time of the operation, lead me to the conclusion that this is a case of congenital unilateral hydrocephalus: the symptoms having been due to compression of the cerebral cortex, were relieved by the escape of the excess of cerebro-spinal fluid.

The non-septic rise of temperature and the polyuria are points of some interest; and I would draw attention to the apparently acquired tolerance of the brain for interference, as seen in the slight disturbance caused by the second operation. I would also point out that the amount of cerebro-spinal fluid evacuated at the second operation was very small, thus showing a tendency to cure; and that it is possible that the recurrence of the fits in April may rather have been due to the irritation of the dura from the cicatrix. I wish to express my belief in the great advance made in cerebral surgery by the adoption of the aseptic system, as I am convinced that had there been any irritating antiseptics used in the first operation the result would have been different.

I trust members will consider that the improvement in the amblyopia and the hemianopsia, but chiefly the freedom from fits enjoyed by the patient for six months, justified the operation.

*Note by Dr William George Sym on the Condition of the Eyes.*

The eye symptoms in the above case of R. M. seem to me to be of great interest. When first seen by me the patient presented the rare condition of a hemiachromatopsia, *i.e.*, over the whole of both fields there was good vision as regards light sense and form sense, but in the left half fields there was colour-blindness. By-and-by, as the case progressed, this "deepened" into loss of both colour- and form-sense, though light was still (imperfectly?) retained in the left half fields. Even though this was the case, the pupil reaction, when light was thrown upon the "blind" half of the retina, was as good as when it stimulated the seeing half. In other words, Wernicke's "half-pupil inaction sign" was not present, showing that the lesion was not in front of the corpora quadrigemina. There was a little degree of pallor of both discs, but very slight, and no evidence pointing to there ever having been optic neuritis.

These facts seemed to me to point to a lesion, situated in the right occipital region, of a very slowly progressive character, and almost certainly pressing from within outwards (subcortical) rather than pressing from without inwards (*e.g.*, dural) or than being actually cortical. I therefore cordially agreed with my colleagues as to the advisability of operative interference, and believed that, without doubt, the cause of evil would be found in the right occipital region. It will be observed that after operation, and as the direct result of the removal of pressure, form-vision began slowly to return in the left half fields, and improved to a very considerable degree, while even colour-vision to a slight extent re-appeared.

Another very interesting point in regard to the fields of vision in this case was the concentric restriction of the retained half fields. This peculiar feature, as has been shown in a large number of cases now, appears to indicate a situation of the lesion, not confined solely to the occipital lobe, but stretching forwards into the region of the angular gyrus. Dr Stewart's notes of this case show that, evidently, the distension of the ventricle was very decidedly present in that direction.

I have not been quite able to explain, to my own satisfaction, the phenomenon in regard to nystagmus which was present, *viz.*,—that while the *left* half of vision was gone,

nystagmus was markedly greatest when looking to the *right* side. Both eyes were equally affected, looking to the right, therefore the symptom was not due to pressure on the sixth *nerve*, and, had it been due to interference with the sixth *centre*, one would have expected conjugate deviation to the right or to the left, according to the degree of interference;—neither was present. I am in some doubt as to the precise causation of the phenomenon.

## 2. ON THE USE OF PICRIC ACID AS A PRIMARY DRESSING FOR BURNS

By ALEXANDER MILES, M.D., F.R.C.S. Ed., Surgeon to Leith Hospital

IT will, I think, readily be admitted that the methods hitherto at our disposal for the immediate treatment of severe and extensive burns are far from satisfactory. In such cases the amount of damage to tissue varies at different parts of the injured area, and varies irregularly, so that usually we have in any given patient several “degrees” of burning to deal with. The treatment suitable for the more superficial degrees is less appropriate for parts which have been burned to a greater depth, and as the precise degree of a recent burn is at first sight almost impossible to determine, it is obviously difficult to select the appropriate dressing with certainty.

The selection of a first dressing for a recent extensive burn or scald depends on the answer to the question—What are the objects aimed at in the local treatment of such a case? These are, I take it—(1) *to relieve pain*; (2) *to prevent sepsis*, so that we may reduce the amount of discharge from suppuration to a minimum, and thus obviate the necessity for frequently changing the dressings; (3) *to allay the inflammatory process* induced by the irritation of the moist or dry heat as the case may be; (4) *to prevent the spread* of the inflammatory process to surrounding parts, which have necessarily been devitalised. This point is closely bound up with the question of sepsis, dryness and infrequent dressing; (5) *to promote the rapid separation of sloughs* with a minimum of suppuration, by a process of dry gangrene, and so to diminish the amount of tissue which will require to be replaced by contractile cicatricial material; (6) *to encourage*, as speedily as possible, the formation of a covering of *healthy granulations*.

When we ask ourselves how far our ordinary dressings, such as eucalyptus, carbolic or Carron oils, boracic or other ointments, alkaline lotions, or powders of various kinds meet these different indications, we must admit that they fall far short of our desires. The very multiplicity of the agents recommended argues for their inefficiency.

Experiments with picric acid (carbazotic acid) have recently been made on the continent by Delpech, Thiery, Filleul and others, and later, D'Arcy Power has brought this method under the notice of surgeons in this country. Some months ago I showed to the Society a number of patients on whom I had tried the effects of this treatment for burns of varying degrees of severity, and as the method appears to me to be vastly superior to any other with which I am acquainted, I venture to describe it in greater detail than was possible on the occasion referred to.

*Method.*—When a patient, say a child whose clothes have caught fire, is met with suffering from extensive burns, the parts are carefully cleansed with weak carbolic or boracic lotion, and unless the shock is profound chloroform is administered to enable this to be thoroughly done. Blisters are pricked and the separated epidermis removed. A single thickness of ordinary white surgical lint, or pads of sterilised gauze, are lightly wrung out of a solution of picric acid, made up as under—

Picric acid	ʒiiss
Absolute alcohol	ʒiij
Distilled water to	ʒxl.

and applied to the sore and adjacent areas. A moderately thick layer of corrosive wool is put on over this, and retained in position by a bandage—preferably a many-tailed bandage to prevent undue movement of parts at subsequent dressings. Where possible a splint to ensure rest is advantageous. It is important to observe that the dressing is *not* put on as a poultice.

*Subsequent dressings.*—The time which may elapse before the dressing is changed depends on the amount of discharge, the smell from the dressing, and the patient's temperature. In some very severe burns I have left the original dressing on as long as five days; in others it has been necessary to change it earlier, but never before the third day. The procedure

is precisely the same as at the primary dressing—careful removal of all discharge, thorough purification, and reapplication of the lint out of picric acid solution. It is not necessary to remove any portion of the original dressing, which is perfectly dry and firmly adherent to the wound. It should simply be moistened by a stream of fresh picric acid from a swab. The dressing is repeated once or twice a week according to circumstances.

*Value of chloroform in the dressing of burns.*—I should here like to emphasize the advantage of administering chloroform for the dressing of these burns, especially in children. Without anæsthesia it is impossible to ensure that thorough cleansing, which is so essential to the exclusion or control of sepsis, without subjecting the patient to an amount of pain and exposure which must be hurtful. A small dose suffices, and the advantage both to patient and surgeon amply compensates for the slight extra trouble and risk.

*Advantages of the picric acid method.*—From what I have seen of this method I think it possesses the following advantages:—

1. *Simplicity.*—Nothing could be less troublesome than the application of the dressing.

2. *Painlessness.*—The solution does not appear to cause any pain when prepared as above. If methylated spirit be substituted for absolute alcohol it may do so.

3. *Asepsis.*—Judging from the small amount of discharge, the comparative absence of smell, and the modified temperature of the patient, even after several days the effect of picric acid in keeping down septic changes seems to be greater than that of the other substances in general use.

4. *The small amount of discharge and absence of smell of course depend on asepsis.*

5. *Infrequent dressings.*—This also is a result of asepsis, and is an enormous advantage to everyone concerned. With none of the ordinary methods can intervals of from three to seven days between dressings be allowed to elapse with comfort and safety.

6. *The astringent action of picric acid on the dilated blood-vessels of the surrounding hyperæmic areas, is of value in controlling inflammation and preventing that spread which is popularly believed to go on for eight days after a burn.*

7. *Its effect in promoting the growth of epithelium* (keratoplastic action) is most evident in superficial burns, which are often covered over with astonishing rapidity under a single dressing.

8. The rapidity with which *sloughs separate* and *granulations spring up* is another advantage of the method.

9. *Absence of symptoms of poisoning*.—I have never seen, nor have I read, of any symptom arising during the use of this drug, which could be attributed to its absorption.

10. A not-unimportant advantage in many cases is the *economy in dressings* which is effected as a result of the infrequency with which they have to be changed.

*Disadvantages*.—The only inconvenience attending the use of picric acid for this purpose is the staining of the hands and bed-clothes. The hands may be protected to a great extent by smearing them with vaseline before using the dressing, and by washing with turpentine and methylated spirit after. Stains are easily removed from cotton or linen clothes by ordinary laundry processes, but are permanent in woollen or flannel articles.

*Cases in which it is applicable*.—The method has been recommended by the various authors referred to chiefly for cases of *superficial* burning, and undoubtedly the results obtained by it are most striking in these cases. This is to be expected, and the same may be said of any of our methods. I have used it in burns of all degrees,—even to the fifth and sixth degrees of Dupuytren where joints have been exposed—and am convinced, that as a primary dressing, it is superior to any other I have seen. In one case where the patient had been burned over both hands, my house surgeon, Dr Milne, applied picric acid dressing to one hand, and eucalyptus oil to the other. He assures me that in regard to painlessness, dryness and rapidity of healing, the picric acid was much the superior dressing.

*Limits of the method*.—Like all methods of treatment it has its limits. A time comes in the course of the deeper varieties of burns, when the indications for treatment change. After the inflammation has subsided, the sloughs been thrown off, and a covering of granulations formed, the condition presents nothing peculiarly inherent to a burn. A healthy healing ulcer has been produced, and must be treated on the same principles as

TABLE OF CASES OF BURNS TREATED WITH PICRIC ACID.

No.	Patient.	Age.	Nature of Accident.	Degrees of Burn. <sup>1</sup>	Situation of Burn.	Day of 1st Dressing.	Duration of Picric Acid Treatment.	Number of Dressings.	Result.	Remarks.
1.	Geo. M.	34.	Gas explosion.	1st and 2nd.	Face.	3rd.	10 days.	3	Recovery	—
2.	David K.	28.	Gas explosion.	a. 2nd and 3rd. b. 3rd.	a. Back of left hand and fingers. b. " right " " c. Face, neck, scalp, and ears.	5th.	27 days.	5	do.	a. All healed in 27 days. b. " " 17 days. c. " " 27 days.
3.	Hugh M <sup>c</sup> N.	4.	Scald with hot tea.	1st and 2nd. 3rd.	Both legs in patches, and genitals.	4th.	—	Frequent.	do.	Dressed frequently as he wet his dressings.
4.	Mrs G.	70.	Bursting of paraffin oil lamp.	1st, 2nd and 3rd.	a. Upper part thorax, neck, cheek and chin. b. Left hand. c. Right foot.	4th.	a. 28 days.	8	—	—
5.	Wm. W.	21.	Burned with molten iron.	3rd and 4th.	Right foot.	3rd.	b. 13 days.	5	do.	—
6.	Mina C.	11.	Clothes caught fire.	a. 2nd. b. 4th. c. 1st, 2nd and 3rd.	a. Left side face and left arm. b. Left hand. c. Chest, and right hand and wrist.	4th.	68 days.	12	do.	Intervals of 5, 6 and 7 days between dressings. Earlier dressings under chloroform.
7.	Wm. B.	4.	Clothes caught fire.	3rd and 4th.	Neck, [chest, axilla and upper arm.	4th.	16 days.	5	do.	Patient treated at home for some time before admission.
8.	Fanny B.	49.	Clothes caught fire.	1st, 2nd, 3rd and 4th.	Both legs and abdomen nearly up to level of umbilicus; genitals.	—	4 days.	0	Died.	Genitals much damaged, and great difficulty with micturition. After death dressing found dry, and burns looked well.
9.	Mary B.	2½.	Clothes caught fire.	a. 3rd, 4th and 5th. b. 2nd, 3rd, 4th, 5th, and 6th.	a. Face, ears and scalp. b. Both hands and arms.	4th.	14 days.	4	do.	Dressed under chloroform. Sloughs all separated, leaving cartilages of nose and ears; and joints of fingers exposed. Surfaces granulated well. Died of pneumonia.
10.	Bessie P.	8.	Clothes caught fire.	a. 1st, 2nd and 3rd. b. 3rd and 4th. c. 1st and 2nd. d. 3rd and 4th. e. 2nd, 3rd and 4th. f. 1st and 2nd.	a. Right hand, forearm, and upper arm. b. Left hand, forearm, upper arm, shoulder and axilla. c. Chest, abdomen and back. d. Buttocks. e. Both thighs. f. Face and ear.	5th.	11 days.	2	do.	About five-sixths of surface of body burned. Dressed under chloroform. Burn looked well, dry, sloughs separating. Died of pneumonia.

<sup>1</sup> Dupuytren's classification. 1st degree = Hyperemia; 2nd degree = Vesication; 3rd degree = Partial destruction of true skin; 4th degree = Total destruction of true skin; 5th degree = Charring of muscles; 6th degree = Charring of bones or joints.

any similar surface from whatever cause resulting, by protective dressings, skin-grafting, etc. Picric acid is perhaps no better for this purpose than Carron or eucalyptus oil, but it is no worse. The chief merit of the method seems to be that it brings a burn into the state of a healthy healing ulcer more simply, more safely, and more rapidly than do the older methods. This having been done its usefulness ceases.

*Results.*—I have tabulated a few cases typical of the different degrees of burning which I have had under treatment in the wards of Leith Hospital during the last twelve months. In addition to these other cases, some of great severity have been treated by my colleague, Dr Stewart, and a large number (80-90) of superficial burns have been similarly dealt with at the out-patient department; and by the district nurse in the cases of patients treated at their own homes. This method of treatment, therefore, has been employed in the practice of Leith Hospital in over 100 cases with results which have been uniformly satisfactory in the various directions already indicated. The resulting scars have been in no way inferior to those obtained by other methods, and inasmuch as the amount of tissue destroyed by suppuration is less, the amount of subsequent cicatricial contraction is correspondingly diminished.

### 3. RESILIENT STRICTURE OF THE URETHRA AND ITS TREATMENT

By CHARLES WATSON MACGILLIVRAY, M.D., F.R.C.S. Edin., Surgeon to the Royal Infirmary, Edinburgh, Lecturer on Clinical Surgery, Edinburgh

STRICTURE of the urethra is one of those ailments for which many methods of treatment have been suggested. Some of these are specially applicable for certain varieties—for example, in slight and early cases gradual dilatation is usually adopted; in cartilaginous stricture with fistulæ, external urethrotomy, and in cicatricial stricture near the meatus internal urethrotomy, while very frequently social reasons on the part of the patient and individual preference on the part of the surgeon determines the choice rather than the certainty that one method will give better results than another. In most cases whatever method be ultimately decided on one can confidently anticipate a considerable amount of relief from the distressing symptoms; but



there are always certain varieties which are liable to lead to disappointment, and of all these, resilient stricture is perhaps the most annoying to both surgeon and patient. This form frequently comes on in comparatively young men, is very irritable, and associated with spasm, and although of small dimensions—forming, indeed, a mere ring round the urethra—often leads to complete retention, and presents considerable difficulties to the introduction of even the smallest instrument. When, however, an instrument has once been passed it is surprising with what ease larger instruments, even up to a No. 12 or a No. 18, may be introduced, and the patient goes away charmed with the speedy relief of all his discomforts. Unfortunately, in almost every case the result is the same—re-contraction takes place, and the patient returns shortly in the same state as before, whatever method of treatment may have been adopted.

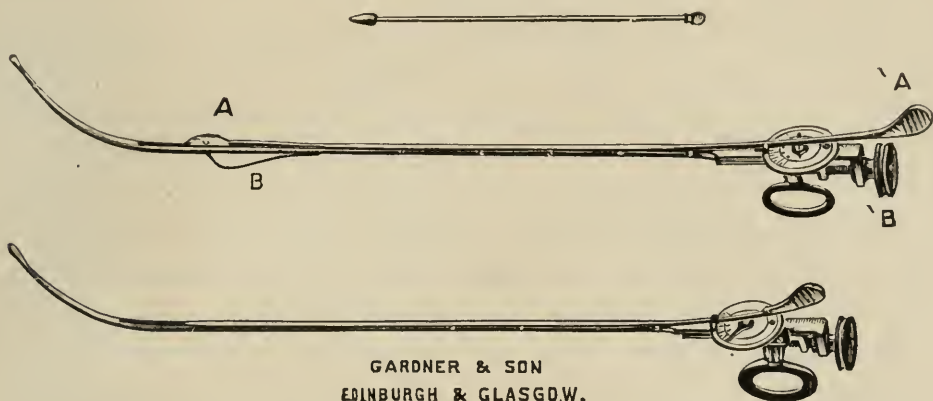
The only two methods which in my experience have attained somewhat better results are those of Holt and Maisonneuve. These might be described as rough but effectual, and I was thus led to consider the special features of this form of stricture and wherein lay the difficulties of its treatment. Now, what strikes one most is the ease of dilatation and the rapidity of re-contraction, and in these respects it may be said to resemble very closely an indiarubber ring. One knows how easily such a ring can be dilated up to any size short of rupture, but how at once, on the removal of the dilating instrument, it returns to its original dimensions ; by analogy, therefore, gradual dilatation is evidently inapplicable to the treatment of this variety of stricture, but, on the other hand, if by any means one can divide such a ring it at once ceases to act. So long, therefore, as it remains whole it will contract concentrically ; but divide it and any contractile power it possesses will rather tend to draw the cut ends apart, and so long as it remains severed it can never act as a constricting agent. Turning again to the resilient stricture, one has to consider what is the best method of severing the constricting band. Two methods at once suggest themselves. While gradual dilatation is useless, sudden dilatation up to, say No. 18, English scale, will tend to rupture the band, and of this method Holt's is the best example, not employed as usually recommended, by passing one dilator, followed by another of a larger size, but by dilating suddenly by means of a large dilator. This, though effective for the

time being, is rough surgery, and does away with what Holt described as an essential feature of his method—namely, that the mucous membrane should remain intact, the submucous layer in which is situated the stricture being alone affected. If employed as here suggested the mucous membrane is sure to be torn, and one knows that a lacerated wound does not heal kindly, causing as it does a large amount of cicatricial tissue to form, which will reproduce the stricture. This being unsatisfactory the next method is internal urethrotomy, but before considering how this can best be performed let us return to the idea of the indiarubber ring and see how cutting acts upon it. Take a sharp knife and attempt to divide it, and you will be surprised to find how difficult this is to accomplish so long as the ring is unstretched; put it on the stretch, however, and a mere touch with a sharp edge will cause it to fly asunder. It is evident, therefore, that in order to perform internal urethrotomy satisfactorily, stretching the stricture is an indispensable preliminary; any instrument with merely a small concealed knife, however sharp, will not be sufficient.

Now what are the various forms of apparatus at present available? These may be broadly divided into those which cut from before backwards and those from behind forwards, and for accuracy and precision most surgeons will admit that the latter are preferable. It is always easy to make out the anterior end of a stricture, and by means of an acorn-headed stem or by other methods one can generally determine its posterior limit, and be thus informed as to its exact position, size, and dimensions; one can, therefore, be much more accurate and limited in a cutting operation in the latter case than in the former. The disadvantage, however, of nearly all the instruments as yet invented for cutting from behind forwards is that from their size they are unsuited for any except moderately-sized strictures, such as will admit a No. 4 to No. 6 bougie, and that they do not introduce the principle of stretching as well as cutting. There are exceptions to this rule, Otis' urethrotome being excellent, but only for large-sized strictures, and Heron Watson's, on the principle of a Syme's staff, which from the employment of a large knife has the disadvantage of making it difficult to regulate the depth of the incision. It was evident, therefore, that what was required was an instrument which could

penetrate the smallest strictures, would introduce the principle of stretching so that the least touch of the knife would thoroughly divide the constriction, while at the same time the cutting edge should be as limited as possible.

Of all the instruments with which a practised hand is likely to be successful in penetrating a tight stricture, none in my experience surpasses Heron Watson's graduated steel probe-pointed bougies and catheters, and I therefore took one of these as the ideal from which my instrument was to be evolved. My first idea was to modify Heron Watson's urethrotome, for undoubtedly the shoulder, as in Syme's staff,



- GARDNER & SON  
EDINBURGH & GLASGOW.
1. ACORN-HEADED STEM, GRADUATED IN INCHES TO DETERMINE POSITION OF STRICTURE.
  2. URETHROTOME AS IN USE.
  - A. PROBE-EDGED KNIFE EXPOSED BY TRACTION ON HANDLE 'A.
  - B. WATCH-SPRING LOOP, PROJECTED BY SCREW AT 'B. EXTENT OF PROJECTION SHOWN AT HANDLE.
  3. URETHROTOME WITH MECHANISM CONCEALED, AS WHEN INTRODUCED, GRADUATED IN INCHES ON SHAFT ON NEAR SIDE OF MECHANISM, SO AS TO BE CERTAIN OF BEING BEYOND STRICTURE.

is useful in determining the exact site of the stricture, but I then thought that in cases of double stricture the simpler probe-pointed instrument would be more easily introduced, and there is really no difficulty in localising the position of a constriction. The instrument I finally decided on may be briefly described as follows:—It is of steel, probe-pointed, and gradually increasing in size up to No. 5, the curve being that of an ordinary bougie; the under side is hollow, but with a slit of about two inches in length, this opening commencing just where the curve joins the straight portion. In this tube is a wire, flattened like a watch-spring, opposite the slit, and fastened to the instrument at its point by means of a hinge.

This can be projected to any desired extent in the form of a loop through the slit by means of a screw in the handle. On the upper surface is a groove, which becomes deeper just past the slit, and holds a small concealed probe-edged knife similar to that employed by Otis or Maisonneuve. This can be protruded by pulling on the wire to which it is attached, which runs in the groove. The straight part of the instrument is graduated in inches commencing at the near end of the slit, so that one can be sure that both the cutting and stretching apparatus are behind the stricture. The accompanying drawing, however, will better explain the mechanism of the instrument than any detailed description.

The method of application is as follows. The patient having been prepared for operation by rest in bed, dieting, and the administration of salol, a few drops of castor oil medicated with 5 per cent. of eucalyptus oil and 10 per cent. of cocaine are to be injected so as to render the urethra insensitive and obviate the necessity for a general anæsthetic. The exact position of the stricture having been ascertained, the urethrotome is to be introduced through the stricture so that the mechanism is behind it in the dilated portion of the urethra, the graduated scale on the stem enabling one to do this with accuracy. Then by means of the screw in the handle one projects the dilating loop to any desired extent. This from its shape can now, by slowly withdrawing the instrument, be made to stretch the stricture to its fullest extent, and on projecting the knife the slightest touch of the cutting edge is sufficient to thoroughly divide the stricture, and one is surprised to find how the instrument at once becomes loose in the urethra; the knife being now replaced in its groove, the instrument is withdrawn with the loop still projecting, so that any other constriction can be at once detected and divided. The operation is practically painless, the bleeding insignificant, and without difficulty graduated bougies of the full stretched capacity of the urethra, generally up to No. 18 or No. 20, can be at once introduced. The further treatment of the case can be carried out according to the individual views of the operator. As a general rule I prefer to tie in a large sized gum elastic catheter for three or four days, but I have also passed a catheter at regular intervals, and even allowed the patient to pass urine as required, with only in one instance urethral fever supervening.

The results of this method of treatment have been eminently satisfactory. I usually pass a large instrument within a fortnight of the operation and again after six weeks, as I am sure that in such cases the frequent passage of instruments only tends to set up irritation. In favourable cases I have been able to pass a No. 15 six months after the operation, no instrument except on the occasions I have already mentioned having been passed in the interval.

In this connexion there is one point in the treatment of stricture which I do not think has been sufficiently emphasized, and that is that whatever be the form we have to deal with or the method employed, it is necessary to dilate the constriction up to the full stretched capacity of the urethra. In any case the stricture is sure to quickly re-contract two or three sizes below its dilatation, so that if one is content to stop at No. 12, which may be taken as the usual unstretched capacity of the urethra, a rapid re-contraction takes place down to No. 9; but as No. 9 is below the normal capacity, force is required to expel the urine, posterior dilatation and irritation at the seat of stricture follow, and further constriction occurs; while if one dilates the urethra, say, up to No. 18, the rapid re-contraction narrows the lumen only to No. 15, and the urethra thus remains undilated and unirritated by the passage of urine, and further contraction is slow and very gradual.

Were I to have another instrument constructed there are various points in regard to which I think improvements might be made. Firstly, I think it worthy of consideration whether a shoulder, as in Syme's staff, might not be an advantage, so as to rapidly indicate the position of the stricture; this, of course, could be placed at the proximal end of the dilating mechanism. Secondly, it might be advisable to reverse the positions of the dilator and knife, as it seems to be generally considered preferable to cut on the floor of the urethra rather than on the roof. Thirdly, the dilating mechanism is capable of improvement. It would be better if it was fixed, say, by parallel bars, as in a resistant stricture it gives somewhat, and then does not put the part as fully on the stretch as might be desired. And, lastly, although the probe on the edge of the knife is theoretically perfect, I think I have got better results with a knife without any blunt edge, its small size especially, when part of the cutting edge is occupied by the probe, result-

ing in a firm stricture not being thoroughly divided by the first attempt and requiring reapplication.

I have now employed this instrument in about twenty cases of strictures in all parts of the urethra without any complication (except in one case, when slight shivering followed the first passage of urine), and with uniformly excellent results. I can, therefore, with the utmost confidence recommend it to the attention of the profession.

#### 4. ON BASAL MENINGITIS

By JAMES CARMICHAEL, M.D., F.R.C.P. Ed., Physician to the Royal Hospital for Sick Children; Clinical Lecturer on Disease in Children in the University of Edinburgh, with Pathological Comment by Dr ALEX. BRUCE

BASAL meningitis is a disease with a tolerably definite clinical significance. In tubercular meningitis the disease, although almost invariably found at the base of the brain, shows a much wider extension towards the peripheral parts, especially along the Sylvian fissures. In septic or purulent meningitis the disease is often universal as regards the distribution of the inflammation in the meninges. Basal meningitis shows in most cases a strict and almost unvarying localisation to that portion of the base of the brain posterior to the optic chiasma, extending back to the pons and medulla and adjacent surfaces of the cerebellum. The etiological pathology of the disease is as yet unknown. Some cases, a very small minority, show a syphilitic history. Others have followed a blow on the head. A few exhibit the characteristic symptoms so soon after birth as to point to the probability of congenital or antenatal causes. As regards the course of the disease, chronicity seems to be the rule. The outstanding clinical facts are that the disease usually occurs in the period of infancy and the characteristic symptom is cervical opisthotonos; some of the cases, however, show not only tonic spasm of the nuchal muscles, but those of the back as well, the child exhibiting a typical and complete picture of opisthotonos.

In a large number of cases the fatal result is brought about by intracranial pressure slowly increasing from acquired hydrocephalus, due to obstruction to the circulation of cerebro-spinal fluid by occlusion of the small foramen of Majendic. The mode in

which the foramen becomes closed varies somewhat in different cases in the manner hereafter to be noticed, and which is well illustrated in the following cases.

CASE I.—H. R., a male child, aged five months, admitted 5th November, 1892; died 25th February 1893, on account of attacks of difficulty of breathing coming on, especially at night. The symptoms began about two months ago, up to this date the child being reported healthy and thriving.

*Family history.*—Both parents in good health. Two other children healthy, aged 11 and 13 respectively.

*Present illness.*—Two months ago mother noticed he made a snoring noise while awake, and soon after, this was observed to recur during sleep. A week before admission he had a very bad attack while asleep. The breathing seemed to stop, and he got “black in the face.” Since then, these attacks have recurred at intervals.

*State on admission.*—Temperature normal. He is a well-nourished and well-developed baby. He makes a snoring noise during inspiration as if from nasal obstruction. The alæ nasi are drawn together during the inspiratory act. On examination of the nasal passages no obstruction or stenosis can be detected. Examination of mouth and fauces shows the tongue retracted and the soft palate lying upon it, so that the post-pharyngeal wall cannot be seen; the palatal reflex is present, and on depressing the post-third of the tongue the uvula and soft palate are drawn up, but not sufficiently to see the posterior pharynx distinctly. Examination with the finger shows slight adenoid thickening in the pharynx.

*Chest* is well developed. There is evident inspiratory difficulty. Expansion is free in its upper part and there is inspiratory recession in the epigastrium and indrawing of the diaphragmatic insertion and lateral bases, producing a kind of hour-glass shape of the chest during respiration. Auscultation shows a loud and harsh respiratory murmur without accompaniment, except that of the loud snoring sound which is heard all over the chest.

The *circulatory* and *alimentary* systems show no abnormality. The child takes his bottle freely.

*Nervous system.*—He sleeps fairly well, and his breathing is at times quite natural, the fits of dyspnoea coming on in paroxysms. The thumbs of both hands are indrawn on the palms. There is no rigidity of any of the other muscles. The skin reflexes are fairly active. Patellar reflexes are with difficulty elicited—no ankle clonus; Körnig’s symptom absent.

*Progress of the case.*—The attacks of dyspnoea recur at very irregular intervals. At times, especially when he is taking his bottle, the respiration is quite free and easy. When the attack

comes on. it is noticed that he makes a series of inspiratory efforts of increasing force, during which no air enters the chest and there is great lateral retraction of the thoracic walls and epigastrium. During these efforts to breath he wriggles about and at last draws in a long gasp of air with a loud snoring sound, and the respiration is soon re-established, after which he generally has a fit of crying. During the attack the mouth is partially open and the tongue quite retracted, apparently shutting down the epiglottis. Forcible pulling forward of the tongue or depression of its base relieves his breathing to some extent, although not completely.

*Nov. 12th.* — A week after admission the child was in much the same state, but losing flesh. In consultation with Dr M'Bride he agreed with me that there was some adenoid thickening in the pharynx, and we decided to remove some tissue in the hope of giving the child relief. This was done, but without any beneficial effect. On the contrary the child became feverish for about a week, and had a good deal of mucous discharge from mouth and nostrils.

*Nov. 19th.* — A very severe attack occurred on this date, during which the respiration completely ceased, and the child became pulseless and appeared to be dead, artificial respiration aided by a tube passed into the larynx, restored the breathing. The tube had to be kept in for two hours, as immediately it was removed the breathing stopped. Two hours after the child had a convulsive seizure, with clonic spasms of the limbs and internal strabismus. This left him in a semi-comatose condition, and the convulsive seizures recurred at intervals with cervical opisthotonos. For a week he could not swallow, and was fed per rectum and by stomach tube.

*Nov. 28th.* — All the constitutional disturbance, apparently due to the removal of the adenoids, had disappeared. The temperature again normal — attacks of dyspnoea recurring as before.

*Dec. 7th.* — He has again begun to take his bottle. The head has been continuously retracted since last report. Cutaneous sensibility normal — plantar reflexes well marked — knee jerk exaggerated. The limbs are too rigid to elicit ankle clonus. The eyes were now examined with difficulty for the first time. Both discs were swollen and looked pale, with distinctly blurred edges.

*Jan. 18th.* — Since last report he has continued in a state of opisthotonos. He is sensible and takes his bottle, but is becoming much emaciated. The eyes were again examined. Both fundi were deficient in pigment, and the choroidal vessels could be seen through the retina. *Right eye.* — The disc is gray-looking and the vessels narrow. The macular edge fairly well defined, the remaining edges less clear. There is no tortuosity





*Family history.*—Both parents alive and healthy. Mother had one miscarriage. Seven children alive and healthy—two died of meningitis.

*Personal history.*—Two weeks ago he became irritable and cried a good deal, contrary to his usual habit. Vomiting recurred at intervals. For the last three weeks he has been much quieter, and his head has been retracted, and he has had twitching of the muscles of limbs and face. Three days before admission he had a severe general convulsion, and there have been two similar seizures since.

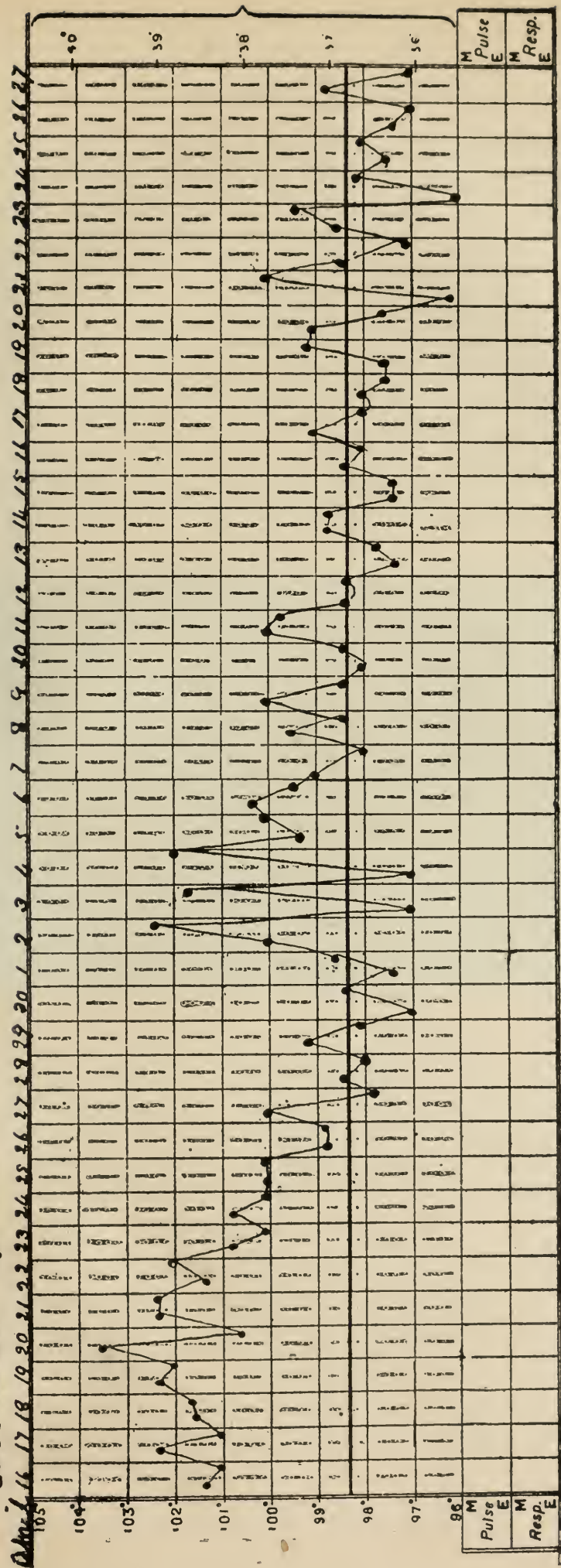
*On admission* he was found to be a well nourished child. He lies in a comatose state. Both pupils dilated but equal. Head retracted. Shortly after admission he had a fit chiefly affecting the left side, although there were slight movements on the opposite side also. The left arm performed an almost rhythmical movement like that of swimming; the left leg being alternately flexed and extended, and also the toes of this foot. When moved, the child often uttered a short sharp cry. The reflexes generally were much exaggerated. Cheyne-Stokes respiration was well marked at intervals. He was rachitic and had six teeth.

*Progress of case.*—The child, until his death, which took place a fortnight after admission, continued in a state of more or less tonic spasm, with recurrent clonic seizures and Cheyne-Stokes breathing. His fontanelle became very prominent and tense, but a curious feature in his case was the extraordinary variations of temperature, ranging from normal to  $106^{\circ}$  with rapid variation.

*Post-mortem examination.*—Body well nourished—rigidity well marked—head twisted outwards, large, anterior fontanelle open and bulging—on removing the calvarium the dura mater was tense, the convolutions were flattened and dry—sinuses somewhat engorged, slight adhesion at the base—simple meningitis in the region of the optic chiasma—cerebellum, back of medulla and around the foramen of Majendie—no lymph, no tubercle—lateral third and fourth ventricles enormously dilated—foramen of Munro dilated—slight softening of the corpus callosum, fornix and walls of the lateral ventricles—spinal cord was normal, but there was slight adhesion of the membrane at the top—other organs normal.

CASE III.—E. F., æt. five months, admitted April 16th; died May 28th. A breast baby—has been “falling off” for some weeks—no previous illness. The mother brought the child to hospital because it was getting thin and was constipated, and had severe attacks of retching. Both parents alive and healthy. Five other children, one healthy, two reported to have died of typhoid, another died of “fits,” a fourth of bronchitis.

*Ellen Varell age 5 mo.*



TEMPERATURE CHART TO ILLUSTRATE DR CARMICHAEL'S PAPER, "ON BASAL MENINGITIS."



*On admission* she was a well formed and fairly nourished child—skin healthy—complexion and hair fair. *Circulatory, respiratory, and urinary* systems normal. She suffered from diarrhœa, which lasted about ten days. Temperature  $101^{\circ}$ . She takes the bottle well. Two days after admission she showed restlessness, and refused food; had two undigested motions. Strabismus was first observed—temperature  $101^{\circ}$  to  $102.8^{\circ}$ , and the anterior fontanelle bulging. The child continued much the same for ten days after admission, suffering from diarrhœa with catarrhal motions. At the end of this time the stools became less frequent and more natural. The temperature came down to normal. The child was apparently convalescing, but seventeen days after admission the temperature suddenly went up from subnormal to  $102.4^{\circ}$ . Five days thereafter retraction of the head was noticed, and she began to



E. F., ÆT. FIVE MONTHS.  
BASAL MENINGITIS—OPISTHOTONOS.

refuse food. There is some strabismus. The reflexes are generally exaggerated. Bowels constipated—occasional vomiting. Complete and well marked opisthotonos now came on, which continued with occasional relaxation of the spasms for short periods until death, which took place about five weeks after admission.

*Post-mortem examination.*—A good deal of fluid escaped on removing calvarium. On under surface of brain, the two adjacent lobes of the cerebellum were adherent to each other and the back of the medulla oblongata, so that the outlet of cerebro-spinal fluid through the foramen of Majendie was completely blocked. The infundibulum was distended and formed an ovoid tumour, which had stretched the optic chiasma and atrophied it. There were a few fibrous lines

on the sides of one or two of the superficial veins of the membranes.

CASE IV.—A. B., æt. two years. She had received a violent blow on the head about a month ago. Two weeks after this the child had a convulsion, which was succeeded by irregular vomiting. The temperature was pyrexial, but never rose above  $101.5^{\circ}$ . For two weeks she remained in much the same state, restless, with twitchings and vomiting, and some rigidity of limbs, but no retraction of head. She gradually became comatose, and died on the twenty-sixth day. *Post-mortem* examination showed cerebral congestion, basal meningitis and hydrocephalus.

There was no effused lymph and no tubercle; enormous dilatation of the lateral third and fourth ventricles, and the foramen of Munro—slight softening of corpus callosum, fornix and walls of the ventricles. Spinal cord was normal except slight adhesions between the dura and arachnoid in the upper cervical region. Other organs normal, and no sign of tubercle anywhere.

CASE V.—*Chronic basal meningitis following acute simple meningitis occurring during an attack of acute (rheumatic) endocarditis.* E. M., æt. 9, admitted with the history of an acute febrile attack beginning about a week ago, accompanied by pains of limbs and body, but no joint affection.

*On admission* her temperature was  $103.6^{\circ}$ . She was very restless, and delirious with left internal strabismus and dilated pupil of same eye. The heart's action was tumultuous with a diffuse shifting impulse, and a loud murmur in the mitral area partly occupying the short pause and replacing the first sound. The respiratory system showed no abnormal sign until the third day after she came into hospital, when pleural friction was found in the left axillary region, and this was accompanied by increased febrile movement and general distress of the patient. Five days after admission, in the evening, there was a sudden fall of temperature to subnormal, but an aggravation of symptoms; she now became more delirious and very noisy, brows knit, staring eyes, nystagmus of both eyes, squinting; urine and fæces were now passed involuntarily. During the next two days she continued in this drowsy and restless state, the temperature gradually rising to  $100.2^{\circ}$ . Convulsive twitchings were now noticed in the face on the left side, and also in the arm and leg. These were succeeded by general clonic spasms and a rise of temperature to  $103.6^{\circ}$ . She now became completely comatose, with equally dilated pupils and abolition of conjunctival reflex, nystagmus, and squinting. The general convulsions becoming more severe and continuous, and having lasted for two hours, and the heart, especially the right side being much embarrassed, with mucous râles in the chest, it became evident that unless the patient

was relieved she could not live long. Four ounces of blood were taken from the left external jugular vein with good effect. The convulsion ceased, and she became quiet. The blood showed the "buffy coat." After an interval of half an hour the convulsion recurred, but in diminished severity, although the attack continued for two hours. There was no further recurrence of fit. Examination of fundi oculorum showed great distension of retinal veins. After remaining in a sort of semi-comatose state for five weeks, she gradually recovered, and was discharged in apparently good health, having been three months in hospital. The case was altogether a remarkable one, the diagnosis being rheumatic endocarditis followed by simple meningitis. The patient came up for inspection six weeks after dismissal, looking healthy and well nourished. The sequel of this remarkable case is still more interesting. Five months after dismissal she was brought into hospital comatose and in a general convulsion which lasted sixteen hours and proved fatal. On *post-mortem* examination the convolutions of the brain were flattened and the sulci effaced,—a large amount of fluid in the subarachnoid space. There was well marked non-tubercular basal meningitis. The infundibulum projected downwards in a thin walled cyst, containing colourless fluid in free communication with the ventricles. There was milky thickening of the membranes over the pons and medulla and posterior aspect of the chiasma. The inferior surface of the cerebellum showed the same appearance, and the amygdalæ were glued together and also to the sides of the medulla. The third and lateral ventricles were enormously distended with fluid, the foramen of Munro admitting  $\cdot 45$  of the cone diameter measure. The foramen of Majendie was completely closed. *The Heart* showed fibrous thickening of the posterior mitral cusp.

Looking into the literature of the subject we find that Lee and Barlow have detailed twenty-five cases all under two years of age. Two of these are noted from birth. The duration of most of the cases was chronic, several months. Cervical opisthotonos was a prominent symptom, the pathological appearances basal meningitis with more or less hydrocephalus. Two of the cases were syphilitic. Dr J. Walter Carr has lately recorded other cases in which the age, symptoms, and pathological appearances were the same. Emmet Holt records two cases which were syphilitic. He also notes other cases, some of which recovered, which were also syphilitic. Apart from the fact that this disease occurs in syphilitic infants, and that it is sometimes in them curable, there is no evidence going to show

this to be the etiological pathology of the larger majority of the cases. In none of those related, with the possible exception of J. M., was there any evidence of syphilis. In Case V. the meningitis was a sequel of rheumatism. In Case III. the head symptoms came on after an acute attack of intestinal catarrh. Case IV. came on after a blow on the head. Two of Lee's cases are noted from birth. The pathological appearances and symptoms in the cases were similar,—basal meningitis with acquired hydrocephalus. In none of the cases, excepting that of J. G., was there any evidence of tubercular disease. In all except Case V. there was retraction of the head as a prominent symptom. The duration of the attack was from two weeks to three months.

DIAGNOSIS—*Cerebro-spinal fever*.—The type of fever in most of the recorded cases, and its absence in some, and their sporadic nature with the non-occurrence on *post-mortem* examination of spinal meningitis and also the absence of the pneumococcus in the exudate, which is so frequently present in cerebro-spinal meningitis, seem sufficient to mark the distinction.

*Tubercular meningitis*.—The duration of this disease is much shorter, the tubercular type of fever, paralysis and evidence of tuberculosis in the lymphatic glands and other organs along with the previous history of the case, showing ill-health of a chronic nature coming on either after measles or hooping cough, are generally sufficient to assure the diagnosis.

*Other forms of simple meningitis*.—In cases of surgical injury, otitis, affection of the nares, mouth, or teeth; in erysipelas, pleuro-pneumonia, scarlatina, or other fevers, meningitis is usually of a septic character frequently purulent; the disease runs a short course with very active symptoms and high temperature, and the meningitis is commonly general and not specially affecting the basal motion of the brain. In middle ear disorder it may affect the temporo-sphenoidal region. In few of these cases do we meet with head retraction.

The following four cases were under the care of my colleague, Dr Playfair, by whose kindness and courtesy they are published here.

CASE VI.—James Morran, 7 years, admitted 14th June 1897, died 24th June; sectio, 25th June.

*History*.—Since infancy has only had the use of one arm—the



left, the other three limbs were useless. The intellect is said to have been good.

On 10<sup>th</sup> inst. he fell, at night he had headache, next day the temp. was 102. Vomiting occurred.

12<sup>th</sup>.—Head retraction present.

14<sup>th</sup>.—Admitted to hospital.

*State on admission.*—He lies in bed huddled up, the knees drawn up on the abdomen. Very marked cervical opisthotonos. Pulse regular as a rule, sometimes irregular. Both knees rigid and lower limbs much wasted, especially the left. No rigidity of arms. The pupils much contracted, especially the left. Child semi-comatose. Leucocytosis (considerable) present. Knee jerks pretty active on both sides.

He remained very much as above described for ten days; semi-comatose all the time except one day when he spoke intelligently. The temperature throughout was very irregular, as high as 104·6 at times.

On the 18<sup>th</sup> he had a slight general convulsion and at other times the right hand showed somewhat tonic contractions. There was no optic neuritis. The head retraction continued till death on June 24<sup>th</sup>.

The brain showed chronic thickening of the membranes at the base; in the usual situation for tubercular meningitis, *i.e.*, around the chiasma and the circle of Willis, the exudation is pale in colour, but of a cicatricial character. The two sides of the great longitudinal fissure are closely glued together by cicatricial tissue, which at the vertex included also the falx cerebri. There is also a cicatricial patch in the membranes in the middle of the upper left temporal convolution, and on both sides of the fissure of Sylvius on the right side. The foramen of Majendie is almost completely occluded by the union of the adjacent surfaces of the two hemispheres of the cerebellum to each other and to the back of the medulla oblongata. The ventricles are evidently much dilatated, especially on the left side. The infundibulum was much dilated, but its projection was obscured by the bulging already noted. On the posterior surface of the upper and lower dorsal regions of the cord there were patches of meningeal thickening, each about 1½" in length.

There was a perforation at the upper part of the right tympanic membrane, with indrawing of the membrane itself. The right temporal bone is much sclerosed about the mastoid antrum. The mastoid antrum contains a yellow jelly-like substance. The mucous membrane lining the antrum seems to be destroyed. The left membrane is indrawn but not perforated.

CASE VII.—William Don, æt. 1½<sup>o</sup>, was ill 2½ months with febrile temperature and some bronchial catarrh. Opisthotonos was well marked, with tonic rigidity of limbs. He died comatose.

*Post-mortem examination.*—Rigor mortis slightly marked in lower limbs. Lividity slight. Abdomen green. Emaciation extreme. Feet pointed downwards. Carpo-pedal spasm. Body very hairy. Dura very tense. Much congestion of convolutions. Great increase of sub-arachnoid fluid at base of brain and sides of medulla oblongata. Very slight thickening of membranes at base. There is a bulging behind the optic chiasma filled with clear fluid. The bulging also appears in front of chiasma. The swelling is nearly an inch in diameter, and extends back to the crura cerebri, which are flattened. There is slight œdema of the arachnoid and choroid plexuses between the flocculus and the sides of the medulla oblongata. There is a slight degree of meningitis over the under surface of the pons, extending laterally over the flocculus on to the lateral aspect of the cerebellar hemisphere, on both sides. This meningitis had extended to a slight degree round the medulla oblongata, so as to close the foramen of Majendie by an exceedingly thin membrane, sufficiently thick, however, to cause occlusion of the foramen.

When this membrane was divided the clear fluid escaped from the fourth ventricle, evidently in communication with the distended infundibulum of the third ventricle. On palpating the brain it was manifest that the lateral ventricles were also distended. There was no evidence whatever of tubercular meningitis.

All the other organs were practically normal. There was slight infiltration of Peyer's patches.

CASE VIII.—Robert Doig, æt.  $1\frac{5}{12}$ , ill two months, suffered from vomiting and well marked opisthotonos. Died comatose.

*Post-mortem examination.*—Child weighed  $7\frac{3}{4}$  lbs.

Head retracted, hands clenched. Slight rigidity, pupils equal. Fontanelle not unusually distended. Convolutions at vertex are flattened, veins not distended greatly. Considerable amount of subarachnoid fluid at base with gelatinous exudation. The infundibulum was greatly depressed, and on opening into it a large amount of clear fluid escaped from the third ventricle. The foramen of Majendie appeared to be closed by a process of choroid plexus in a fibroid condition. There was no distinct evidence of tubercle in either of the fissures of Sylvius or in the median fissure. The whole ventricular system (lateral, third and fourth ventricles) and the aqueduct of Sylvius were dilated. The lining membranes of the ventricles presented a clear semi-translucent gelatinous appearance. *Liver*  $5\frac{1}{2}$  lbs.—Studded to remarkable degree by almost black points and areas apparently due to subserous congestion. It is very fatty on section. *Heart*—Normal. *Lungs*—Normal. *Spleen*  $3\frac{1}{4}$ —Soft, dark-red. *Left kidney*  $5$ gs—Normal. *Right kidney*  $5$ gs—Normal. *Intestines*—The mucous membrane of the intestine is thin and atrophied; no tubercles. The mesenteric

glands seem slightly enlarged. *Stomach* is the size of that of a new-born child. It contains some mucus and shows some dark brown areas in the walls.

CASE IX.—May Jack, æt. 9 months, ill of bronchitis for two months previously—vomiting and diarrhœa pretty constant. Persistent opisthotonos. Tonic rigidity of limbs. Died comatose.

*Post-mortem examination.*—Child well nourished. Rigor mortis slight.

*Heart* 3ii—Normal. *Left lung* 3ii—Normal. *Right lung* 3iii—Normal. *Liver* 3x—Apparently normal. *Spleen* 3i—Malpighian bodies prominent. *Kidneys* 3i each—Apparently normal. *Intestine*—Curious little hardenings of solitary glands and Peyer's patches. *Brain* 1 lb. 6 oz.

Enormous dilatation of foramen of Majendie and fourth ventricle. Pia mater is raised in a cyst-like portion from cerebellum. The cyst measures 1"  $\times$   $\frac{3}{4}$ ". There are numerous white opacities in this cyst, and where it passes on to the cerebellum the opacities present a yellowish colour. The membranes at the base in the neighbourhood of the circle of Willis have a peculiar grey gelatinous look. This extends back over the under surface of the pons, and very slightly to a short distance over the upper part of the pons. There is a peculiar opaque thickening of the membranes at the tip of the left temporal lobe, almost 1" in diameter. The brain substance is extremely soft, as if the ventricle had been dilated. The corpus callosum is greatly thinned and bulged upwards. On raising it the fornix is found to be somewhat macerated, and, below this, the third ventricle is much dilated. The middle commissure is greatly attenuated.

The fluid had been prevented from escaping from the subarachnoid cavity apparently by adhesion of the arachnoid to the cerebellum, and by the fact that it had bound the medulla along the lines of the ganglia of the posterior columns to the under surface of the cerebellum.

In this way the fluid had passed from the fourth ventricle through the dilated foramen of Majendie into the subarachnoid cyst, but had been unable probably to pass further.

The condition was due to chronic non-tubercular basal meningitis.

*Pathological Commentary.*—The foramen of Majendie is a small oval aperture (about  $\frac{1}{3}$  the size of an average little finger nail) in the pia mater, forming the roof of the fourth ventricle. It is the principal outlet of the cerebro-spinal fluid contained in the ventricles, and allows this fluid to escape into the subarachnoid space, to pass out by the cranial and spinal cavities along the lymphatics in the cranial and spinal nerves. Its closure throws the work of removing the cerebro-spinal fluid on the small accessory channels at the side of the medulla above the glosso-

pharyngeal nerves and on the abortive power of the choroid plexuses in the lateral, third and fourth ventricles. For this task they are usually unequal, and the result is a more or less gradual dilatation of the whole ventricular system, the fourth ventricle, the aqueduct of Sylvius, the third ventricle with its infundibulum, the foramina of Monro, and the lateral ventricles. The dilatation of the infundibulum produces a globular swelling which presses on the optic chiasma, and, by causing it to atrophy, is responsible for the blindness which is so frequently present in late stages of the disease.

The manner in which the foramen is closed is not always uniform. We have observed the following varieties:—

1. A simple fibrous covering of the orifice from chronic meningitis spreading backwards along the sides of the medulla. (Cases R. D. and C. G.).

2. (A sub-variety of No. 1.) An exceedingly thin very translucent membrane, bulging backwards and allowing the fluid to project as a small cyst through the foramen—the membrane being so thin that the slightest scratch with the point of a needle was sufficient to allow the fluid to make its escape. (Case W. D.).

3. (Probably the most common form.) The adhesion of the two small adjacent lobules of the lower part of the hemispheres of the cerebellum to each other and to the margins of the fourth ventricle. This drags the uvula down to the foramen, and also prevents the fluid from making its way into the subarachnoid space. (Cases J. M. and E. F.). This form occurs occasionally also in tubercular meningitis (Case J. G.), and will generally be found when there is head retraction in that disease.

4. In rare instances cysts may be formed between the arachnoid and the pia forming the roof of the fourth ventricle. In this case the foramen may be actually open and even dilated; but the fluid prevented from escaping into the subarachnoid cisterns and lymph channels by firm union of the pia with the arachnoid at some distance from the foramen. (Case M. J.).

The *post-mortem* appearances of the other organs of the body were very various, and only in one or two instances did they throw any light on the ætiology of the meningitis. Excluding the case of J. G., where the meningitis itself was obviously tubercular and secondary to tuberculosis of the lung and other organs, none of the other cases showed any tubercular lesion, even M. J., three of whose brothers and sisters had previously died of tuberculosis, and in whom a tubercular cause was suspected, no trace of such could be found. The infiltrations noted in Peyer's patches were, on microscopic examination, found not to be tubercular. In W. D.'s case similar infiltrations of Peyer's patches were formed without any family history of tuberculosis.

In the case of E. F. there was some collapse and emphysema of lung.

In J. M.'s case, the membrana tympani was perforated, and there was disease of the temporal bone.

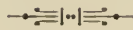
In R. D. the intestine was atrophied, and there was evidence of some recent infective condition in the enlargement of the mesenteric glands and spleen—too recent to have been the cause of the meningitis.

In none of the cases, with the possible exception of J. M., was there any *post-mortem* evidence of syphilis.

TABULAR VIEW OF CASES OF BASAL MENINGITIS.

Name.	Age.	Family History.	Previous Illnesses.	Duration.	Vomiting.	State of Bowels.	Pulse.	Respiration.	Temperature.	Opisthotonos.	Other Spasms.	Sight.	Discs.	Nystagmus.	Hearing.	Sleep.	Stupor.	Coma.	Convulsions.	Temper.	Nutrition.
E. Farrell.	1½	Obedient of fits	None	6 weeks	Present	Constipation	Quick, regular	Regular	Pyrexia	Present	Strabismus	...	...	Absent	...	Fairly good	...	Before death	None	Irritable	Fair
C. Greig.	1½	Menigitis in 2 cases	Measles	14 days	Present	Diarrhoea	Irregular	Irregular	Pyrexia	Present	Clonic Spasms	Good	...	Absent	Good	Good	None	Before death	Present	Good	Good
H. Russell	1½	Good	None	10 weeks	Occasional	Natural	Regular	Irregular	Average normal	Present	Various	...	Optic neuritis	Present	...	Good	Before death	Died comatose	None	...	Gradual emaciation
A. B.	2	Good	None	4 weeks	Present	Normal	Irregular	Regular	Pyrexia	Absent	Convulsions	Good	...	Absent	...	Good	Present	Died comatose	Present	Good	Fair
E. M.	9	Good	Rheumatism	Uncertain	Present	Normal	Regular	Regular	Pyrexia	Absent	Convulsions	Good	Normal	Present	Good	Good	None	Died comatose	Present	Good	Good
John Green	4	...	Measles, scarlatina	3 months	..	...	...	...	Pyrexia	Present	Convulsions	Pupils dilated	...	..	...	...	...	...	...	...	...
Jas. Morran	7	...	Fall and headache 10 days before death	...	Early	...	...	...	...	Present early	Tonic spasm of hand. paralysis	Pupils contracted	Normal	...	...	...	...	Semi-coma	...	...	...
Wm. Don	11½	Good	Bronchitis, fever	2½ m'ths	Absent	Normal	Not slow. 80	Sighing	Pyrexia	Present	Arms rigid	Apparently not equal, no blind at first	Pupils not equal, no neuritis	Absent	Normal	Fair	Early varying	In 6 weeks	None	Irritable	Good, gradual emaciation
Robt. Doig	1½	...	...	2 months	Early	Diarrhoea	...	...	...	Present	...	...	...	...	...	...	...	At death	Before coma	...	...
May Jack	1½	Father, children tubercular	2 months bronchitis	6 weeks	First symptom constant	Diarrhoea	...	...	...	Early permanent	Tonic, arms, legs	No strabismus, pupils equal	...	...	...	..	...	Before death	Before coma	...	...

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